PAPER TRADE JOURNAL

Reg. U. S. Pat. Off.

SIXTY-SEVENTH YEAR

PAPER

Established Feb. 17, 1899
Consolidated Nov. 16, 1899
with PAPER TRADE JOURNAL.

Vol. CVIII, No. 7 Thursday, February 16, 1939

PAPER

Established Sept. 21, 1918
Consolidated Feb. 19, 1925
with PAPER TRADE JOURNAL.

Consolidated Sells Coating Paper Rights

Announcement States Two More Foreign Nations Have Purchased Rights From Consolidated Water Power & Paper Co. To Its Coating Invention and Negotiations Are Pending With Three German Firms—Other News.

[FROM OUR REGULAR CORRESPONDENT]

APPLETON, Wis., February 13, 1939—Two more foreign nations have purchased rights from the Consolidated Water Power and Paper Company, Wisconsin Rapids, Wis., to its coating invention, according to announcement made last week. They are Cartiera-Fedrigoni in Italy, and Saugbrugsporein of Norway. Negotiations also are pending with three important paper manufacturing companies in Germany who are planning to join together to install this coating invention as a joint venture so as to supply German paper buyers with papers produced by this process.

For more than two years, Consolidated's coating invention has been in operation in England, the rights for that country having been purchased by Lloyds and Bowaters, the largest paper company in Europe. Several months ago similar machinery was installed in two mills in France by Papeteries de La Chapelle at Rouen, and Papeteries de France at Persan. The Papier Industries at Cham, Switzerland, started one of these machines last November. During March it is expected a Consolidated coating machine will be in operation in Holland, since the rights there have been bought by Proost and Zoon through negotiations completed last fall.

Consolidated coating machines in England were made by Beloit Iron Works, Beloit, Wis., but the other European machines are made by J. Voith and Company, Berlin, Germany, under rights granted by Consolidated. The invention produces coated papers in one operation on Fourdrinier paper machines, six of which are now in operation in Consolidated mills in Wisconsin.

Larger Appropriation Requested

An appropriation of $1,000,000 will be sought for the United States Forest Products Laboratory at Madison, Wis., instead of the $628,000 it received for the current fiscal year. Representative Hawks of Wisconsin has begun a campaign to acquaint members of the House with the work of the laboratory, and has asked permission to appear before the House appropriation committee when the agriculture bill is considered.

"The forest products laboratory," said Congressman Hawks, "Is one of the least known of the government activities outside its immediate sphere of influence. It has been of great aid to industry and can use $1,000,000 in advantage. The larger appropriation this year will aid in acquainting the country with the work of the laboratory."

Mosinee Employs 200 Men in Woods

Approximately 200 men are logging this winter for the Mosinee Paper Mills Company, Mosinee, Wis., in its large timber tract on the Montreal River near Ironwood, Wis. Several million feet of logs will be cut, including lumber to be prepared in the company's sawmill, as well as its annual pulp wood supply.

The Mosinee camp is one of the largest in Wisconsin, and also one of the most modern. Two large bunkhouses are equipped with steel bunks, the buildings are electrically lighted, and are equipped with shower baths. Equally modern facilities have been provided for the dining hall and kitchen. The life of Mosinee lumberjacks is considered quite a contrast to the earlier days.

The company's own railroad line extends through the timber tract, which, with land owned on the Michigan side of the river, is expected to supply timber for fifteen years. The company also operates its own locomotive.

New Freight Rates Favor Paper Mills

Class freight rates from Wisconsin have been ordered reduced by the Wisconsin Public Service Commission at Madison, Wis., conforming with an order by the Interstate Commerce Commission. The new rates are of particular advantage to the paper mills and allied concerns, since they will equalize competition with mills in other states. Reductions will be as much as four to seven cents per hundred pounds on shipments to southermost cities.

$86,000 Turning Basin Being Considered

The House rivers and harbors committee at Washington has under consideration construction of an $86,000 turning basin in the Fox River at Green Bay, Wis., to facilitate the rapidly growing shipping at this port by Great Lakes vessels. W. F. Kern,

(Continued on page 14)

Recommends Zone Basis for Stumpage Dues

Hon. John H. Kelly In Speech In Legislative Council Suggests Government Could Aid Paper and Pulp Industry By Rating Stumpage Dues On Basis of Zones—Canada's Forests Neglected — Other Late Trade News.

[FROM OUR REGULAR CORRESPONDENT]

MONTREAL, Que., February 13, 1939.—There is some speculation in Quebec as to whether or not the Hon. John Hall Kelly, in a speech in the Legislative Council during the week, anticipated the intentions of the government by various forestry reforms he suggested that would affect pulp and paper companies. Mr. Kelly, who is ranked as an expert on forestry problems, particularly in his home county of Baspe, suggested that stumpage dues and other taxation on the forest products should be calculated on the basis of zones instead of on a universal rate as at present. He declared that a universal rate was not fair these days since some newsprint mills were situated in areas where the cost of operation was lower than in other sections but the product had to be sold at the same rate per ton. The result, he stated, was that some mills made money, others broke even, and others operated at a loss.

He believed there should be a system whereby farmers' wood lots be preserved and a market guaranteed for wood cut thereon, that is certain percentage of wood on private lands should be guaranteed as steady a sale as possible.

He spoke against the practice of obtaining forest areas and holding them for purely speculative purposes, while the mills in the neighborhood suffered from lack of wood.

Suppporting his arguments, he said: Before Quebec became a pulp and paper producing province it manufactured a great quantity of lumber which was sold in foreign markets. Today, with an abundance of soft woods, Quebec does not manufacture enough lumber to supply its own requirements and is obliged to buy what it lacks from other provinces. In 1930 Quebec consumed 410,000,000 feet of soft wood. One half of this, or exactly 203,000,000 feet, was imported from the other provinces. Had this lumber been cut in our own forests, as most of it could have been, it would have supplied, in labor alone, estimated at a conservative average of $10 a 1,000 feet the sum of $2,000,000. Sold at $30 per thousand this would have represented a total of over $6,000,000 for our own people. Last year we had to import one-third of our lumber.

Forestry Policy Criticized

The policy of our pulp and paper companies regarding the development of the forests is largely responsible for the killing of our lumber trade. True it is that the companies required large tracts of timber lands to justify the building of pulp and paper mills but, in a great number of cases, without any justification whatever, timber lands were set aside as forestry reserves in places where such reserves should never have been created, some companies were allowed to acquire more timber lands than they will ever need, saw mills were closed and then dismantled and, over night, hundreds of families and whole communities which had settled around these mills were deprived of their means of existence.

Last year this Legislature laid down the principle that no company holding large tracts of unexploited forest lands might stand in the way of community development, and legislation was enacted authorizing the expropriation of seignorial lands held by the Fraser Companies in the County of Temiscouata.

So that the forests in certain valleys of the Gaspe Peninsula may be developed along with its farm lands and its fisheries, the timber limits now held by certain companies should revert to the Crown. This could be done without injustice by exchanging the said areas for forests in other parts of the province. The Government could then proceed to carry out a well defined policy as it is doing at present in one section of the Gaspe Coast, at Grande Vallee, where limits of the Brown Corporation were recently exchanged for lands elsewhere.

Paper manufacturers, Mr. Kelly noted, were attempting to control the overproduction of paper, resulting from the building of too many mills, and he declared it was equally as important "to determine the quantity of pulp wood that may be cut each year in the province."

"The quantity of wood cut in the province on privately owned lands, as well as on Crown lands, should be limited to the annual growth. Zones of privately owned lands should be established and adjacent mills should be obliged to buy their wood at a price to be fixed according to the market price of paper. With such a policy the farmer and the settler would be certain of a market for their pulp wood. With proper organization the mill owners would also be assured of a definite supply of wood and the balance could be cut on the Crown timber limits," he said.

Recommends Zone Stumpage Dues

Discussing forestry taxes, Mr. Kelly said: "Our Crown Land stumpage dues and other charges are alike throughout the whole province. The Government would materially help the pulp and paper industry if it were to divide the province into zones and base its stumpage dues and other charges upon the cost of production obtaining in these zones. The same treatment should be applied to labor. The cost of living is not the same throughout the province. This factor should be kept in mind in determining the wages to be paid in the lumber camps in the different parts of the province. Knowing that paper sells at a certain price, the rate of wages should be based on that price."

Declares Canada's Forests "Neglected"

J. O. Wilson, past chairman of the Woodlands Section of the Canadian Pulp and Paper Association, in addressing a meeting of the Canadian Lumbermen's Association convention in Montreal, declared that federal and provincial governments were neglecting

the forests, and were putting back very little into them in return for the revenue they collected.

"The indirect revenues are enormous," he said, "and the failure of our forest crops will be a social catastrophe, yet very little is done to finance and assure sustained yield or forest management. It looks as if the parties interested in our forests are each waiting for the other to do what is necessary. The solution lies in getting together, deciding what has to be done and then deciding who can best do it."

The United States forest service presents a very different picture, Mr. Wilson continued. In 1937, $4,000,000 were collected as revenue from national forests, but over $1,000,000 were spent on the forests which will supply the total needs of the United States in the not very distant future.

Among the specific problems confronting the Canadian lumber business, Mr. Wilson listed the need for forest inventories and forest working plans based on sustained yield, woods management, operating, wood utilization, research and forest finance.

The importance of the forest and forest products industries of Canada were indicated by T. A. McElhanney, superintendent, Forest Products Laboratories, in a paper on 25 years of forest products research.

Capital invested in the forest products industries of Canada totalled $853,470,231 in 1936 when the employes numbered 187,574. Salaries and wages paid that year totalled $149,403,989 while the values added by manufacture amounted to $307,085,309.

S. J. Staniforth, of Montreal, was re-elected president of the Association by acclamation. He said Canadian lumber exporters will have a more profitable United Kingdom market this year than in 1938 if the firmer timber market developed in September is maintained, while general improvement in business conditions in the United States should result in Canadian exports in this direction being materially increased during 1939.

Light-weight Paper Becoming Popular

The coming into operation of a trans-Canada air mail service is already developing a new field of business in light-weight paper for Canadian paper manufacturers and stationers, and sales of "air mail bond" are reported to be increasing sharply. One business firm is reported in the papers to be saving $16 a month by use of this paper.

While the new type paper used in Montreal was first imported from Great Britain and later, largely from the U. S., most of what is sold here today is made in Canada. Two paper companies with head offices in Montreal produce the air mail stationery in several different weights, at varying prices. An onion skin pad, produced by an Ontario paper company, is a very popular feature in the new trade, it is stated, selling at a modest price.

Joins N. E. Paper Association

[FROM OUR REGULAR CORRESPONDENT]

BOSTON, Mass., February 14, 1939—Three new members have been added to the New England Paper Merchants Association: C. M. Rice Paper Company, Portland, Me.; Ralph F. Bass, Inc., Roxbury, Mass. and A. M. Eaton Paper Company, Boston.

Commission Reports on Newsprint

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., February 15, 1939—In January of last year, the Attorney General asked the Federal Trade Commission to make an investigation of the newsprint industry to see whether there have been any violations of the antitrust laws. In January of this year the Trade Commission submitted its report to the Department of Justice. At no time has either the Commission or the Department made any statement dealing with this situation until Monday of this week when the Department of Justice issued the following:

"The Department of Justice has received the report of the Federal Trade Commission regarding the investigation which that Commission made into the newsprint industry. This study was made by the Commission in response to a request of the Attorney General on January 24, 1938.

"The Department is examining the report in order to determine whether any violation of the Federal antitrust laws is disclosed therein. No decision will be made as to whether or not the Department will take any action in respect to trade practices and conditions in the newsprint industry until the examination of the Commission's report is concluded."

Robert F. Read Co. Busy

[FROM OUR REGULAR CORRESPONDENT]

DEXTER, N. Y., February 14, 1939—Full time operations are being maintained by the Robert F. Read Company, Inc., a new concern, and orders from the General Electric Company for moulded pulp packing for meters guarantee an exceptionally good outlook for the future. Mr. Read and his associates have finished the big machine which he developed for various kinds of moulded pulp commodities and are now ready to produce on a larger scale. The concern has also booked orders from other concerns for various products and indications are that the mill will operate day and night during the next few months. The mill was formerly the property of the Warren Parchment Company. By use of a huge machine for shaping and pressing products the concern is able to form and complete them rapidly from liquid pulp. The moulded pulp packing is understood to have been given a rigid test by the General Electric Company and the results were most gratifying.

Canadian Paper Directory

The 1939 edition of the National Directory of the Canadian Pulp and Paper Industries has just been received from National Business Publications, Limited, Gardenvale, Quebec, Canada. The price of the book is $3 a copy.

The current edition, edited by J. W. Stephenson, contains much important factual information relating to all major divisions of the Canadian pulp and paper industries. In addition to the usual list of mills, their products and equipment, the financial set-up of companies and a detailed list of equipment, with late statistics on pulp and paper, manufacturers of board and converters, are included.

A number of important personnel changes are noted and the new arrangement in the listing of manufacturers will be found a convenience to users of this comprehensive directory.

Business Good in Chicago Paper Market

Many Distributors of Paper Report Increased Demand For Nearly All Grades of Paper—Charges Announced By American Writing Paper — Suit Brought To Permit Use of Paper Milk Containers — Other News.

[FROM OUR REGULAR CORRESPONDENT]

CHICAGO, Ill., February 6, 1939—The Chicago paper market represented a more optimistic note this week as demand generally was reported as improved. Business was pronounced good in the majority of the offices visited with the basic market structure indicated as steady. Reports were also prevalent showing a strengthening in the book paper market which is expected to help the strength of the entire market. Bonds and ledgers reported good volume during the week while kraft papers also registered real improvement as proof that betterment could be traced to more than the replenishing of inventories. Ground woods were in good demand and the newsprint market also showed a stronger tone. Covers were experiencing a widening of demand. Paper board markets were firmer than for some time. Only one change occurred in the markets for waste paper for February, the price of news being increased from $7 to $9 per ton in the Chicago area. No other item of waste paper was affected, according to local information. Roofing rag prices remained the same as for January and it is understood the roofing mills are proceeding under normal conditions for this time of year and are amply supplied with material. The latter part of the month, it is reported, will indicate the future trend of the roofing rag market.

Changes Announced by American Writing Paper

Recent reassignments as announced by the American Writing Paper Company are reported to have sent W. J. "Jack" LaCrosse back to the home office at Holyoke after a period of service as Chicago office manager of that concern. The shift takes him to the home offices as office sales manager in changes which bring J. H. Sweet into the company as Field Sales Manager directing sales to paper merchants and F. A. Curtis as Field Sales Manager on industrial and technical papers. The departure of Mr. LaCrosse leaves a Chicago office vacancy which it is reported will remain unfilled as Graham Olson, Ralph Burnett and Creighton Whiting continue as sales executives working out of the Chicago headquarters.

Let Election Printing Bids

The paper industry will be interested to know the names of those Chicago printing firms who have been awarded contracts for the printing of February 28 ballots covering the Chicago mayoralty contest. More than 6,000,000 ballots are to be supplied and the requirement divided among several local firms. M. Kallis & Company will furnish 2,652,600 Democratic primary ballots at a cost of $3.42 per thousand. A like number of Republican ballots were ordered from Fred J. Ringley Company at a cost of $3.52 a thousand. Aldermanic ballots will be printed by Fred Klein at a cost of $4.15 per thousand. George G. Rennecker Company will furnish 1,093,408 third party ballots at a cost of $4.10 per thousand and will also print the specimen ballots totaling 1,093,408. The Ringley company will also prepare 3000 specimen aldermanic ballots to cost $4.00 per thousand. Total printing costs are estimated at $36,000.

Employees, Labor and State Effect Agreement

It is reported that employer organizations, labor and the Illinois Department of Unemployment Insurance have virtually reached an agreement on important proposed amendments to the Illinois act which are to be presented to the Illinois legislature in the near future. Employer groups have been working hard to retain experience rating as a necessary adjunct of the Illinois law and it begins to appear as though their work had been successful as well as efforts to simplify the present act to insure a proper working of merit rating provisions. A group of technical experts have been working with the executive heads of five major Illinois employer organizations for over one year to develop the most workable type of a law.

Bring Suit on Paper Containers

A suit to force the City of Chicago and its Board of Health to permit the use of paper containers for milk, which are now used in 46 suburban communities and numerous large cities throughout the country, was filed in Federal Court this week by Fieldcrest Dairies, Inc. The suit asks a declaratory judgment by the court as to the legality of the paper containers and an injunction to prevent the city and health department from interfering with their use. The paper container used by Fieldcrest is that known as "Pure-Pak single service" container, made by the Ex-Cello Corporation of Detroit. Fieldcrest is a company selling milk in Dupage and Lake counties and in Cook County outside of Chicago. S. E. Dean is the president, and offices of the concern are at 20 N. Wacker Drive, Chicago.

New Control for Moisture Test

The Harry W. Dietert Company has designed an adjustable thermostatic control for its Moisture Teller. This thermostat automatically controls the drying temperature at any chosen temperature between 135 degs. and 250 degs. Fahrenheit. This is a desirable feature for drying samples of materials that are sensitive to temperature at which they are dried. A thermometer, as furnished, is used to indicate the temperature of the heated air that is forced through the material that is being dried for moisture determination.

While the Moisture Teller is already being used by a large number of plants in the textile, paper and pulp, sugar, salt, chemical and ceramic industries, the thermostatic control materially increases the range of materials for which the Moisture Teller may be used to rapidly and accurately determine its exact moisture content.

Financial News of Pulp and Paper Industry

St. Lawrence Paper Mill Co. Shows A Profit of $466,620 For Year Ending Dec. 31—Net Loss Is Reported By the United Paperboard Co. — Financial Statements of Other Companies Indicate Substantial Earnings.

NEW YORK STOCK EXCHANGE

High, Low and Last for the Week Ending February 15, 1939

	High	Low	Last
Armstrong Cork Co.	50⅛	47½	48¼
Celotex Corp.	16⅞	16	16⅞
Celotex Corp., pf.	70	70	70
Certain-Teed Products Corp.	10½	9⅞	10¼
Certain-Teed Products Corp., pf.	40	39¾	40
Champion Paper & Fibre Co.	25½	25⅛	25⅛
Champion Paper & Fibre Co., pf.	101½	100	101½
Congoleum-Nairn Co.	26¼	25½	25½
Container Corp. of America	13½	13	13
Continental-Diamond Fibre Co.	8	8	8
Crown-Zellerbach Co.	13¼	12½	12¾
Crown-Zellerbach Co., pf.	90½	88	89
Flintkote Co.	27½	26¼	27⅛
Robert Gair	3⅜	3	3⅛
Robert Gair, pf.	11	10⅞	10⅞
International Paper & Power	12¼	11⅜	12¼
International Paper & Power, pf.	43½	42	43
Johns-Manville Corp.	94½	90½	91¾
MacAndrews & Forbes	31	31	31
Masonite Corp.	49½	49½	49½
Mead Corp.	10	9¾	9¾
Paraffine Companies, Inc., pf.	104	104	104
Ruberoid Co.	27¾	27¾	27¾
Scott Paper Co.	48	47½	48
Scott Paper Co., pf.	115½	114½	115
Union Bag & Paper Corp.	10⅝	10⅛	10⅜
United Paperboard Co.	5¾	5¾	5¾
U. S. Gypsum Co.	98¾	97	97½

NEW YORK CURB EXCHANGE

High, Low and Last for the Week Ending February 15, 1939

	High	Low	Last
American Box Board Co.	7⅜	7⅜	7⅜
Brown Co., pf.	16⅛	15	15
Great Northern Paper	38⅜	38	38⅜
St. Regis Paper Co.	2⅞	2¾	2¾
St. Regis Paper Co., pf.	58	58	58
Taggart Corp.	4⅝	4½	4½

St. Lawrence Earns $466,620

[FROM OUR REGULAR CORRESPONDENT]

MONTREAL, Que., February 13, 1939—The annual report of the St. Lawrence Paper Mill Company Limited for the year ended December 31 last shows profits for the year at $466,620, as compared with $747,794 in the previous year. After providing for depreciation at $325,000, against $625,000 in 1937, and $83,575 for depletioin, as compared with $65,426, there was a balance of $58,045, equal to 40 cents a share on the outstanding preferred in arrears to the amount of $47.25 a share, carried forward to surplus account which now stands at $239,432. Net of $165,368, or $1.16 a share, was reported in the preceding year. The report shows sharp increases in inventories and bank loans but an improved working capital position.

Newsprint sales during the year totalled 94,490 tons compared with 147,417 tons in 1937. The 1938 sales were 53 per cent of capacity.

Net working capital at December 31, 1938, is shown at $659,334 against $312,026 a year ago. Inventories are up in excess of $700,000 to $2,413,655 and accounts receivable increased by $89,000 to $781,197. Bank loans show an increase of $692,000 to $2,285,253 with accounts payable down $283,000 to $277,886.

United Paperboard Report Loss

The United Paperboard Company, Inc., and subsidiaries report for six months ended November 26, 1938, net loss of $374 after depreciation and federal income taxes. This compares with net profit of $63,011 equal after dividend requirements on 12,920 shares of non-cumulative 6 per cent preferred stock, to 10 cents a share on 240,000 shares (par $10) of common stock for six months ended November 27, 1937.

For quarter ended November 26, last, indicated net loss (based on a comparison of company's reports for first quarter of fiscal year and the six months period) was $13,875, comparing with net profit of $21,277, equal after preferred dividend requirements, to one cent a share on common in November quarter of previous year and net profit of $13,501, equal to $1.04 a share on 12,920 shares of 6 per cent preferred stock for quarter ended August 27, 1938.

The Consolidated income account of United Paperboard Company, Inc., and subsidiaries for six months ended November 26, 1938, follows: Net sales $1,052,563; cost and expenses $1,022,018; operating profit $30,545; other income $15,114; total income $45,659; other deductions $10,320; depreciation $35,583; federal income taxes $130; net loss $374.

Great Northern Reports $2,168,809 Net

The Great Northern Paper Company reports as follows for 1938: Net profit, $2,168,809, equal to $2.17 each on 997,480 shares of $25 par capital stock. Net profit in 1937 was $2,177,654, or $2.18 a share on 997,580 shares then outstanding. Current assets as of December 31, 1938, including $5,118,049 cash, amounted to $14,174,749 and current liabilities were $1,070,260 compared with cash of $4,844,130, current assets of $14,744,720 and current liabilities of $1,307,094 at end of preceding year. Inventories were $7,416,023, against $8,403,281.

Maclaren Nets $1,241,148

[FROM OUR REGULAR CORRESPONDENT]

MONTREAL, Que., February 13, 1939—The annual report of the Maclaren Power and Paper Company for the fiscal year ended November 30 last shows net earnings from operations of $1,241,148, sufficient to meet bond interest, exchange, other interest, etc., of $1,104,782 and leave a balance of $136,366 available toward depreciation and charges of a non-recurring nature. In the preceding year net operating earnings amounted to $1,713,203 and after bond and other interest, etc., of $1,087,677, there was available for depreciation in that year $625,526. After providing $677,115 for depreciation for the 1938 period and expenses of a non-recurring nature of $71,945, there was a net loss for the year of $612,694, contrasted with a net loss of $139,196 in the previous year.

Consolidated current assets of $2,100,458 at November 30, 1938 compare with $1,490,177 at November 30, 1937. Current liabilities of $3,752,903 compare with $3,033,547 and the excess of current liabilities over current assets of $1,652,445 with $1,543,370. Total assets are slightly higher at $38,508,714 against $38,478,587 and fixed assets, after depreciation and amortization, slightly lower at $35,639,762 against $36,238,608.

May Reopen Plant at Felts Mills

FELTS MILLS, N. Y., February 14, 1939—It is rumored hereabouts that the local branch of the Sherman Paper Company may resume operations in the near future under the ownership of Abe Cooper. If the resumption occurs it will probably be some time this spring or early summer and will provide work for those who lost their jobs last fall when the several branches of the Sherman Paper Company were closed. When the concern went into bankruptcy the water powers were separated from the mill property and disposed of to the Central New York Power Corporation. The mills and equipment were then disposed of to Mr. Cooper. The latter made attempts to enlist the interest of other paper concerns to take over the property but failed to secure a purchaser. For some time he has been contemplating placing the Felts Mills plant in condition so as to manufacture a grade of paper for which there is a good market. It is understood that he plans to hire an experienced superintendent who thoroughly understands the practical and technical side of paper manufacture while he will look after the management of the business and marketing of the product himself.

U. S. Gypsum Reports $4,725,496

The United States Gypsum Company and subsidiaries reported last week for 1938 a net income of $4,725,496, compared with $5,421,010 in 1937. This was equal to $3.50 a common share after payment of preferred dividends and compared with $4.08 a share in 1937. Sewell L. Avery, chairman, reported that expenditures last year for additions and improvements to plant assets amounted to $2,299,860.

Brompton Pulp Earns $119,233

The Brompton Pulp and Paper Company, Ltd. (Controlled by St. Lawrence Corporation, Ltd.) and Subsidiaries report as follows for 1938: Net income $119,233, equal to 40 cents each on 300,000 capital shares, against $403,281, or $1.34 a share, the year before.

Eddy Nets $1.14 Per Share

Eddy Paper Corporation for 1938 reports a net profit of $212,336, equal to $1.14 each on 185,048 shares of common stock, compared with net profit of $649,937, or $3.65 each on 178,000 shares, in 1937.

Hummel-Ross Earns $53,450

Hummel-Ross Fibre Corporation for 1938 reports a net profit of $53,450, compared with net profit of $608,097 in 1937.

SELLS COATING PAPER RIGHTS

(Continued from page 9)

secretary of the Green Bay Harbor Commission, told the committee the improvement was important to all northern Wisconsin, since 80 per cent of the commerce at Green Bay is trans-shipped to the interior. Coal, sulphur and pulp wood are received there for paper mills. It was pointed out that large vessels must pass through three bridges to turn around, and the basin would eliminate this delay in shipping, as well as tying up traffic. Congressman Joshua L. Johns of Wisconsin, is supporting the appropriation.

W. L. Badger to Speak to Chemists

W. L. Badger, manager of the consulting division of the Dow Chemical Company, will speak on "History of Unit Operations" at a meeting of the Northeast Wisconsin section of the American Chemical Society February 15. The meeting will be held in the chemistry lecture room at Lawrence College, Appleton, Wis. The talk is to be a discussion of old type equipment for carrying out various unit operations and will be illustrated with slides taken from sixteenth and seventeenth century engineering books. A collection of the old books also will be shown.

Mr. Badger has been with the Dow Company since 1917, and has published about 60 papers in technical journals. He has written three books on chemical engineering subjects.

C. F. Saecker Reelected

Carleton F. Saecker, secretary of the Appleton Machine Company, Appleton, Wis., has been reelected president of the Appleton board of vocational education. John Watson, of the Wisconsin Wire Works, Appleton, was reelected vice-president.

Potdevin Holds Annual Display

The Potdevin Machine Company will hold its annual display of operating paper converting machinery in conjunction with the Paper Convention. Potdevin Display Hall, covering 6000 square feet, will house a selection of operating machines including self-opening square, dry cleaner, cellophane satchel-bottom and flat and square bag machines.

The well-known "Century Line" high-speed, flat and square grocery, notion and millinery bag machines featuring the Potdevin-patented tapeless, vertical delivery will attract particular interest. Multicolor, multi-size aniline and oil-ink web presses for printing kraft, cellophane, glassine, sulphite, etc., will be shown as well as a rotogravure unit for lacquering the printed web. Other stock machines which will be shown are bundling presses, cement bag valving machinery and slitting machinery equipped with the Potdevin-patented sidewise web register control.

Visitors to Potdevin Plant 2 will see numerous pasting and gluing machines, conveyor gluers and paper shredding machinery. Part of the display will be devoted to exhibits of rubber plates, aniline inks, cellophane adhesives, cores, chucks, bearings, static eliminators, recording tachometers etc.

This display will be held February 20-25 inclusive at the Potdevin Display Hall, 1223 38th street, Brooklyn, N. Y. Arrangements for transportation can be made with Mr. Julian Richmond, whose headquarters, as usual, are at the Waldorf-Astoria Hotel.

Delaware Valley TAPPI Hears R. B. Wolf

The Delaware Valley Section of the Technical Association of the Pulp and Paper Industry met at the Engineers Club, Philadelphia, on February 10, 1939 with C. M. Connor, chairman, presiding. Over 60 members registered for dinner and many additional members attended the meeting.

The chairman announced that the section now possesses a lantern projection machine that was purchased recently and the projected joint meeting with the Division of the Supt. Assoc.

Chairman Connor presented R. B. Wolf, manager of the pulp division of the Weyerhaeuser Timber Company, Longview, Wash. and a charter member of TAPPI with the remark that Mr. Wolf is a recognized authority on the manufacture of sulphite pulp. The title of Mr. Wolf's address was "Recent Developments in the Manufacture of Sulphite Pulp".

Mr. Wolf gave some quantitative figures on the consumption of sulphite pulp in the United States and these figures showed that sulphite pulp is slightly ahead of sulphate. He then gave tonnages and percentages on domestic production of the various chemical pulps as against the quantities imported from foreign countries. These figures indicated that sulphite pulp production in the U. S. lags in percentage the sulphate production.

He then talked about the means being used and the precautions being taken for the development of the pulpwood forests of the northwest. In this connection, he mentioned the good work being done by the U. S. Forestry Service.

The newer west coast pulp mills represent the most modern equipment and processes, and use the best technique known to date in producing sulphite pulp to meet the varied demands of the paper mills and the use requirements of the customers.

Intensive research has been and is constantly carried on to learn the effects of thermal action, chemical action and the chipping. High temperatures generally are not recommended or used because of the deleterious effect on the fibers, however, for some specific quality in a pulp, high temperatures may be used, although this may reduce the yield. High chemical concentrations seem to have less destructive action on the fibers. Careful chipping of the pulp wood is necessary for obtaining the best results.

Experiments are being made in the sulphate process, using Douglas fir as the raw material, but much work has to be done before commercial pulp is a reality. The removal of coloring matter, knots, etc., present real problems in this respect.

The discussion of printability, raw water, length and diameter of fibers, pitch, black water soluble material, kinds of wood used for sulphite pulp and processes then followed. Hugo Hanson, James d'A. Clark, John F. Halladay, C. M. Connor, L. K. Larson, G. L. Schwartz, R. W. K. Ulm, M. D. Reuben, A. V. Arsenault, J. R. Nagle and some others were leaders in the discussion which finally had to be cut short after more than two hours.

Among those present were:

C. M. Connor, Vincent Waters, H. H. Hanson, J. F. Halladay, Howard H. Street, Ward Harrison, C. W. Rivise, J. A. Dean, Paul Koenig, Robert B. Wolf, Jr., Robert B. Wolf, James d'A. Clark, L. K. Larson, G. L. Schwartz, N. D. Cunningham, J. R. Atwater, C. W. Hoffman, J. E. Lande, W. P. Richardson, W. E. Brow, R. W. Kenneth Ulm, F. W. Brainerd, J. D. Davis, R. B. Thomas, J. D. Miller, M. D. Reuben, Arthur J. Arsenault, John R. Nagle, James H. Hazelwood, Fred Streicher, W. I. Reifsnyder, V. Jacobsen, Charles L. Ellis, Frank Schneider, Alex. McInnes, Jr., G. F. Hom, A. W. Brandt, Jr., Henry Reeves, Jr., J. C. Kieffenderfir, O. C. Cordes, Harrison J. Farra, Samuel M. Bratton, A. E. Waugh, Walter S. Bryde, A. W. Cooper, L. F. Derr, H. F. Hoffmann, James H. Fritz, L. W. Crouse, E. T. Street, Jacob Edge, S. G. Briscoe, J. J. Lofferty, Wm. D. Marshall, Elliot I. Stokes, Richard H. Dillinger, J. Carl Schmidt, Edw. J. Albert, Thomas W. Toovey, W. F. Mitchell, G. W. Banbury, M. Middleton, George B. Martin.

Southern Pulp and Paper Club Meets

Local members of the Southern States Pulp and Paper Club held an informal dinner meeting on the evening of February 6 at which about forty were present. W. F. Allen, committee on arrangements, acted as toastmaster and introduced the principal speaker of the evening, Henry A. Johnstone of the Paper Makers Chemical Division of the Hercules Powder Company, who entertained the group with a most interesting informal talk relative to the history, development and use of size.

D. G. Moon, general chairman of the club reported that the total membership to date was 150 and that a preliminary announcement had now been sent out to all but local members regarding the big meeting to be held on April 18 during the Paper Festival. He also informed the group that the Southern Paper Trade Association had accepted an invitation to attend as well as various members from the forestry groups and other associations.

Plans were discussed by O. W. A. Rodowski, chairman of the committee for arrangement of the exhibition which is to be sponsored by this Club which will be of an educational nature tending to show the development of the Industry in the South.

A number of the members' wives were present and discussed informally some tentative arrangements for organizing an auxiliary.

The following attended: J. S. Fox, H. F. McLeory, Mr. and Mrs. D. G. Moon, Mr. and Mrs. J. D. Robinson, Mr. and Mrs. R. H. Stevens, J. T. Wegner, J. H. Saile, Mr. and Mrs. M. A. Lockwood, J. T. Pryor, S. W. Dodge, O. M. Bridges, Mr. and Mrs. W. L. Campbell, Mr. and Mrs. A. F. Downey, Mr. and Mrs. W. F. Allen, Buel Dean, Phil Shuey, F. S. McCall, O. W. A. Rodowski, Olin Sanders, L. L. Clapp, A. O. Mortensen, H. F. Scordas, W. T. Harbin, H. E. Hazen, A. S. Boyer, W. N. Moore, L. V. Graham, Jr., F. M. Hawes, R. S. Baughn, T. S. Humphrey, Henry A. Johnstone.

In connection with the luncheon to be sponsored by the Southern States Pulp and Paper Club plans are being made to set the table service entirely from paper, that is tablecloths, napkins, plates, cups and goblets. Invitations are to be extended to executives, technicians, chemists and engineers from other visiting groups to attend the luncheon and meeting as guests on April 18.

Canada Produces Less Insulating

Production of insulating board in Canada during the 12 months ended December 31, 1938, totaled 48,610,979 surface feet, according to statistics released by the Dominion Bureau of Statistics, Canada. This is a decrease of 3,875,270 surface feet compared with total production during the previous 12 months.

Pacific TAPPI Discusses Vocational Education

The Pacific Section of The Technical Association of the Pulp and Paper Industry held its fourth dinner meeting on February 7, 1939, at the College of Puget Sound, Tacoma, Wash. The dinner was held in the Commons dining room, where the guests of the evening were presented. These were: W. R. Barber, Crown-Zellerbach Corporation, Camas, Wash., B. L. Grondal, College of Forestry, University of Washington, K. A. Kobe, Department of Chemical Engineering, University of Washington, F. A. McMillen, Department of Chemistry, College of Puget Sound, A. J. Sorenson, Department of Chemical Engineering, University of Washington, and G. H. McGregor, Weyerhaeuser Timber Company, Longview, Wash.

N. W. Coster, chairman, called the meeting to order in the lecture room, and the following subject was discussed: "Organization and Operation of a Pulp and Paper School." W. R. Barber, Crown-Willamette Division, Crown-Zellerbach Corporation, Camas, Wash., told of the organization of a school at the Camas mill in 1933 as a joint function between the management and employees of the mill. At the end of the first year, many students decided to continue, so a second year course was added and subsequently, due to the demand of the students, a third and fourth year were added to the course. From the registration figures submitted, it appears that there is a strong interest in the school, and beneficial results have been obtained.

George H. McGregor, Weyerhaeuser Timber Company, Longview, Washington, discussed the organization of a vocational school established in Longview three years ago. This school is maintained by the Federal and State Vocational Education Departments, and students pay a fee of three to five dollars per year. The attendance is limited to those who are actually employed in the pulp and paper industry or whose livelihood is dependent upon that industry. Students are obtained from the Pulp Division, Weyerhaeuser Timber Company, Longview Fibre Company, and Pacific Straw Paper and Board Company. The third year of this school shows that there is continued interest.

A discussion followed on these two types of schools and the training of college students for positions in the pulp and paper industry. The paper, "Specific Heats and Boiling Temperatures of Sulphate and Soda Black Liquors," by K. A. Kobe and A. J. Sorenson, of the Department of Chemical Engineering, University of Washington, Seattle, was not presented at the meeting, but was available for discussion by those who desired.

Those who attended were as follows:

Jerry Alcorn, W. R. Barber, John H. Baker, Iver S. Belsvig, Emil Berger, Richard S. Buckley, A. M. Cadigan, Harold D. Cavin, R. E. Chase, R. E. Chase, Jr., Kenneth Chapman, Sidney M. Collier, N. W. Coster, H. N. Evans, J. D. Fraser, Harry Fromong.

N. O. Galteland, Irving R. Gard, B. R. Gardner, A. A. Garrett, Gordon M. Gay, A. S. Gerry, William R. Gibson, W. W. Griffith, Bror L. Grondal, Kekketh B. Hall, L. C. Haffner, S. H. Harrison, H. R. Heuer, W. S. Hodges, Albert H. Hooker, Jr., George W. Houk.

B. L. Kerns, Frank G. Keuss, John O. Kjome, K. A. Kobe, George H. Krueger, Robert M. Kuhn, R. E. LeRiche, Henry W. Loren, Robert W. Martig, D. K. MacBain, G. H. McGregor, F. A. McMillin, R. S. Niccolls, Fred Nicholson.

W. M. Osborne, Frederic M. Pape, Peter Parent, J. W. Peckham, Paul A. Pittinger, Oliver E. Ronken, A. J. Rosengarth, Don L. Ross, B. W. Sawyer, George E. Schmidt, Harlan Scott, J. E. Shackelton, Brian Shera, John R. Smith, Lawrence K. Smith, Arvin J. Sorenson, Stanley E. Sorenson, P. E. Sullivan.

Richard D. Tripple, Cecil Tripleet, H. A. Vernet, J. W. Ward, Harold F. Warren, Storrs W. Waterman, Jr., L. H. Wear, Wm. T. Webster, L. H. Wendt, John M. Wilcox, Edward P. Wood, L. R. Wood.

New History and Economics of Papermaking

Harper & Bros., Publishers of New York and London, have announced that they are about to publish "The Background and Economics of Papermaking" by Dr. Louis T. Stevenson of New York.

The book is planned for those who are interested in both the history and the economic aspects of papermaking.

The history of papermaking is the history of civilization, as we know it. The printed word is the basis for practically all of our developments as civilized people and papermaking has been the primary development necessary to the advances made in the printing arts.

When papyrus was cut off from Western Europe, the Dark Ages followed. When papermaking came to Europe, the Dark Ages began to dissolve. After printing from movable type was invented, the Renaissance developed.

The dynamic effect of papermaking progress upon all aspects of our civilization is pointed out in the chapter on the history of the art.

The rest of the book is taken up with a description of economic aspects of the industry. The factors of production—Labor, Capital, Natural Resources, and Management—are discussed and analyzed. Demand for paper is analyzed. The Business Cycle is related to paper production. The adjustment of Supply to Demand through price behavior is considered. Various controls are analyzed and discussed. The probable future development of the industry forms the concluding chapter.

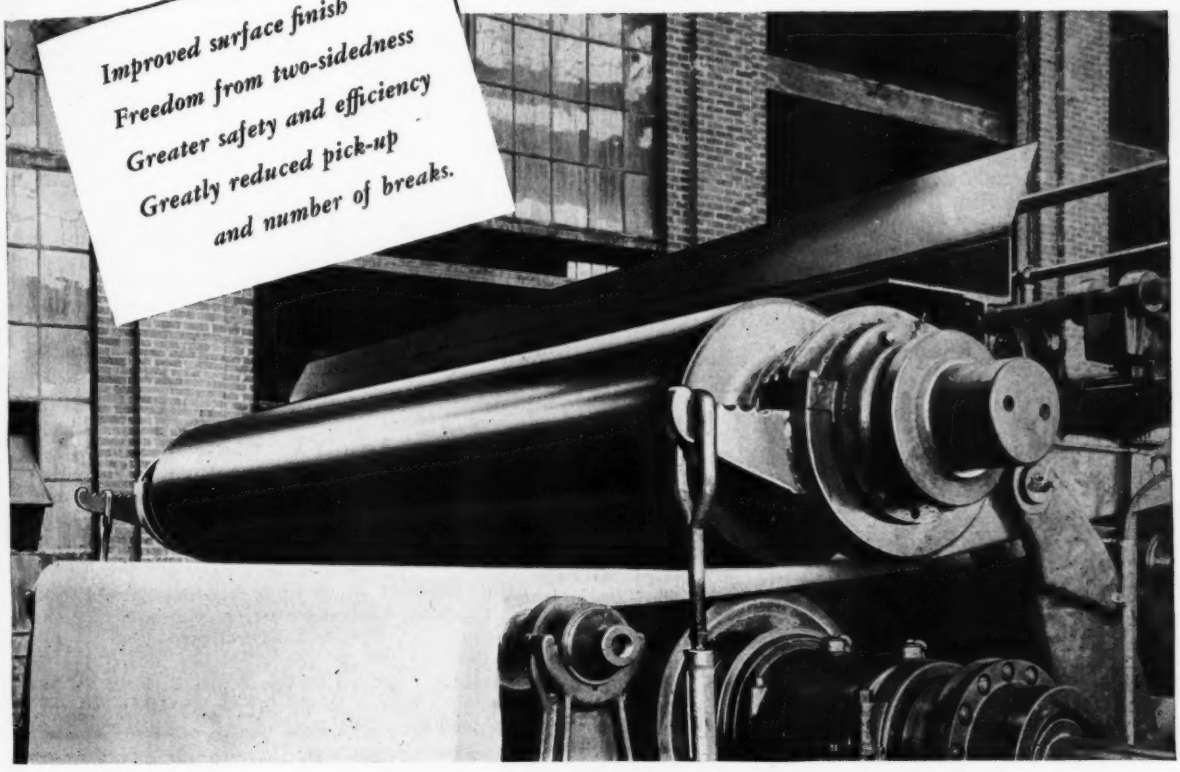
Dr. Stevenson's book is the first of its kind to be published. Dr. Stevenson's long experience as a paper manufacturer and member of paper trade associations, and his more recent studies in this specialized field of Economics make the book authoritative. He is at present chairman of the Industrial Engineering Committee of TAPPI. His papers contributed to TAPPI and to trade papers on economic subjects related to the Paper Industry have been timely.

Mr. R. G. Macdonald, Secretary of TAPPI, says of the book, "I enjoyed reading the manuscript and know that it will be helpful to paper company executives."

A copy of the manuscript will be available for inspection at the TAPPI desk at the Roosevelt during the TAPPI Annual Meeting.

The book is to be sold at $3.00 a volume when published and a special price of $2.50 a volume is being made to those who order prior to publication. Orders may be sent to the publishers, to TAPPI or to Dr. Stevenson.

Guaranteed for CLIFTON



by STONITE* *Rolls*

TOP PRESS AND SMOOTHING

(Ebonite and Granulated Stone Composite U. S. Patent 1,787,890 Re. 18,111)

The service record of the 1577 STONITE* Rolls now operating in 31 countries leaves no doubt about the performance that Clifton Paper Board Co. can expect from this installation. In selecting these modern rolls for top press service on their new machine, they followed the example of modern mills in all parts of the world.

Photo shows one of the two 24 x 150-inch Stonite Rolls in top press position on the new Bagley and Sewall machine recently installed at Clifton, New Jersey.

STOWE-WOODWARD, INC. NEWTON UPPER FALLS · MASS.
NEW YORK OFFICE · WOOLWORTH BLDG.

Makers of WHITE STAR *Rubber Covered Rolls,* TANNITE *Couch Rolls*
STONITE *Top Press and Smoothing Rolls—All by the* COREWELD *Process*

Stowe-Woodward Rolls are made on the West Coast by HUNTINGTON RUBBER MILLS, INC., *35 West Lander St., Seattle, Washington*

Obituary

Harry M. Ross

Harry Marsden Ross, 59, vice-president and general superintendent of the Beveridge Paper Company, Indianapolis, Ind., died January 28 at his home, 3602 Winthrop avenue, after a long illness.

Known widely among paper manufacturers, Mr. Ross was associated with the Beveridge company 34 years and was credited with having developed several processes for manufacturing highly specialized grades of paper. He had held the dual position of general superintendent and vice-president since 1929.

Born in Appleby, England, Feb. 12, 1879, Mr. Ross came to this country with his parents when he was 4 years old. He lived in Xenia, O., and in 1905 was married to Miss Nell Downey of Cedarville, O. Mr. Ross became associated with the Beveridge company the year of his marriage and, five years later, came to Indianapolis to live. He became general superintendent in 1924.

Surviving are his widow, a son, two daughters and two grandchildren. Burial was in Memorial Park cemetery.

Eugene W. Cole

[FROM OUR REGULAR CORRESPONDENT]

KALAMAZOO, Mich., February 14, 1939—Eugene W. Cole, 60, traveling representative for Bagley & Sewall Company of Watertown, N. Y., died at the Borgess Hospital February 9, 1939 following a three weeks' illness.

He had been a resident of Kalamazoo for five years coming here from Watertown. He had been identified with the paper industry for many years, having been associated with the Munising Paper Company, Watervliet Paper Company, Bryant Paper Company and spent some time in Wisconsin. He is survived by his widow Elizabeth, a son Delmonte, two daughters, Mrs. Bessie Miller of Benton Harbor, Mich. and Mrs. Lillian Gray of Petoskey, Mich, a sister Mrs. Edith Rich and two brothers, Delmonte E. and John all of Kalamazoo.

Joseph Dix Snell

BOSTON, Mass., February 14, 1939—Joseph Dix Snell, treasurer of the Von-Olker Snell Paper Company, died of pneumonia in his 75th year February 3 at the Deaconess Hospital, Brookline, after an illness of about two weeks. His residence was in Longmeadow, Wellesley, Mass., but this winter he was living at 132 Marlboro street, Boston.

Mr. Snell was a graduate of the Dorchester High School. At the age of 18, about 1883, he first became associated with the paper industry, entering the employ of A. Storrs & Bement Co. He remained with this company until 1887, when he went to Carter, Rice & Co., Corp. He served in various capacities with this concern until 1913. In that year, he formed the Von Olker-Snell Paper Company with Perry Von Olker, who died in 1929. He was treasurer of the company from the beginning.

Mr. Snell, who was well known, was president of the New England Paper Merchants Association in 1923. He was secretary of the Boston Paper Trade Association from 1922 to 1924, second vice-president of that organization from 1924 to 1926, and first vice-president from 1926 to 1928. Although in line for the presidency, he declined to serve in that position.

His widow, Grace (Elder) Snell, and a step-daughter, Josephine Grace Stranahan, of New York City, are living.

The funeral services were held Saturday afternoon at All Saints Church, Ashmont, of which he was formerly senior warden and treasurer. Bearers were Charles C. Beebe, O. N. Purdy, Jr., Hubert W. Lockhart, Henry B. Robertson, John Brewer, Charles A. Esty, John E. A. Hussey and Charles S. Proctor.

James J. Smith

[FROM OUR REGULAR CORRESPONDENT]

TORONTO, Ont., February 14, 1939—Stricken with a sudden heart attack, James J. Smith, superintendent of the finishing room of the Mission plant of the Abitibi Power & Paper Company, Limited, Fort William, Ont., died recently when being removed from the mill to a hospital. He was fifty-two years old and had always been in good health. Mr. Smith went to Fort William to reside in 1922 from Sault Ste Marie, Ont. He was with the Abitibi organization until the closing down of the mill in 1933 when he entered the employ of the Great Lakes Paper Company as assistant boss finisher. He left the Great Lakes to return to the Abitibi Company in 1937. He was keenly interested in sports and leaves five children. One son, Jack Smith, is a noted hockey player, at present with the Atlantic City Sea Gulls.

Clifford H. Allen

[FROM OUR REGULAR CORRESPONDENT]

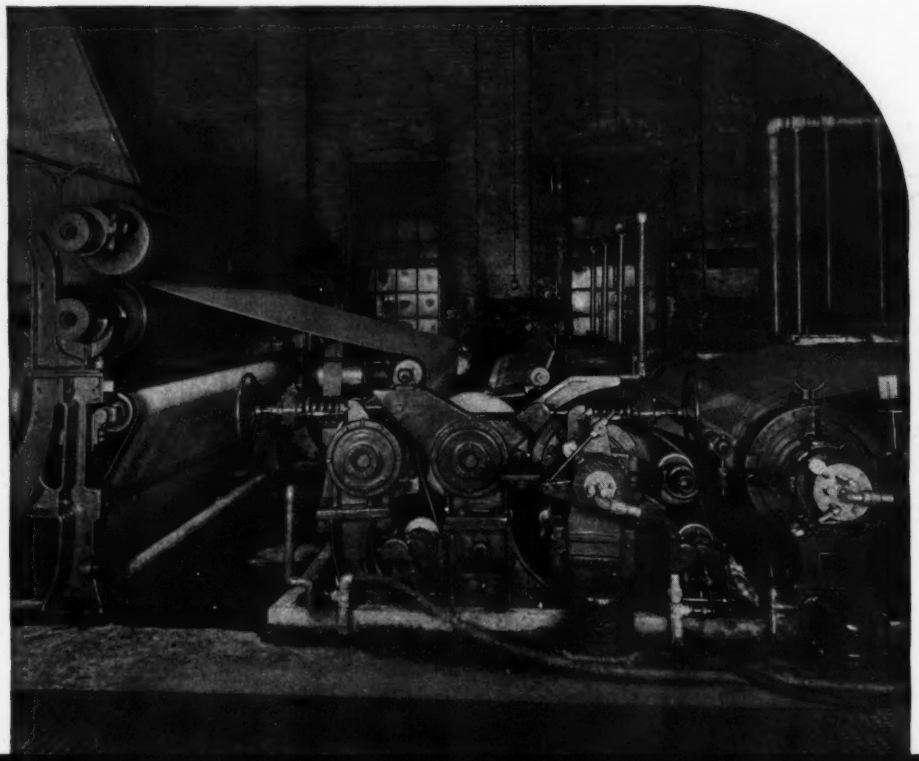
GLENS FALLS, N. Y., Feb. 14—Clifford H. Allen, retired paper manufacturer, died this week at his home here after a brief illness. He was 72 years old. After graduating from Hamilton College he joined his father in the operation of Allen Brothers Paper Company at Sandy Hill. The concern sold its business to the Union Bag & Paper Company in 1907, after which Mr. Allen retired from the local business field. However, he maintained an interest in a paper mill at Plattsburg until a few years ago. The principal survivors are his widow and two nephews.

Robert E. Nevin

TORONTO, Ont., February 14, 1939—Word has been received of the death of Robert E. Nevin who passed away on January 25 at his home in Vancouver, B. C., at the age of 79. He was a well known figure among British Columbia saw mills and paper manufacturers. In 1910, he was in charge of construction of the old Ocean Falls pulp and paper plant and in 1916 was engaged with the Crown-Willamette interests as local manager in charge of construction of the great paper plant. He leaves a widow, two sons and one daughter. Mr. Nevin was born in Wigan, England, and came to America when 18 years old.

Joe Salwen Paper Co. In New Quarters

The Joe Salwen Paper Company has removed to new and larger quarters at 405 East 4th street. The concern is mill agent and distributor of boxboards and lining and also various other papers for manufacturing purposes.



BELOIT HORIZONTAL
Dual Press

PATENTS PENDING

—A MAJOR STEP FORWARD

IMPROVED QUALITY OF PAPER

INCREASED PRODUCTION

GREAT SAVING IN FELTS

THE BELOIT WAY IS THE MODERN WAY

BELOIT IRON WORKS BELOIT WISCONSIN

H. H. Field Retires as Secretary

At his own request, H. H. Field has begun a period of semi-retirement from active duties at the Lindsay Wire Weaving Company, Aspinwall avenue, Cleveland, manufacturers of Fourdrinier and cylinder wires for paper-making. On February 10, the effective date, a testimonial dinner was tendered Mr. Field at the Cleveland Club, on which occasion a silver plaque was presented to him.

"Harry" Field went to work for Lindsay on June 12, 1905. In 1911 he was chosen a director; in 1916, secretary; in 1930, treasurer. He has seen the company's facilities grow from a one-story frame building to its present eight modern brick-and-steel buildings, and the capacity of its original four looms multiplied sixteen times.

H. H. FIELD

Mr. Field relinquishes the title of secretary, remaining a director as well as treasurer.

Paper and Twine Club's Guns Trained On Price-Slashing

Curbing of "cutthroat" selling is revealed as one of the principal objectives of the Paper and Twine Club's nation-wide sales training program for the paper industry. Speaking for the educational committee of the Paper and Twine Club, Secretary John L. Richey stated that this thought is uppermost in the minds of the men who are devoting almost a year of their time to the preparation and application of this training.

"We have found, through an extensive field survey," said Mr. Richey, "that the problem of meeting destructive price competition is one of the most serious of all those confronting paper salesmen. Entire territories can eventually be demoralized by the unintelligent and shortsighted selling methods of a few violators of ordinary common sense. The fact that many sales made by this method are virtually profitless seems unimportant to the men making them."

Mr. Richey then went on to point out that the survey also showed that these conditions are not limited to any certain territory. "Most of the paper men we have talked with," said Mr. Richey, "are of the opinion that one of the most effective ways of overcoming this problem is through education starting from the bottom up. An industry-wide sales training program, designed specifically for the purpose, is the first step. Halfway methods will not do."

Proof of the common need for such a sales training program, and the sincere interest and national support being offered, are the hundreds of letters that have literally swamped the offices of the Paper and Twine Club. Letters offering scholarships, advance enrollments, financial aid, endorsements, and requests for participation have come in from more than 40 states, 3 provinces of Canada and from as far away as Hawaii—all in less than one month. The Paper and Twine Club's plan, designed originally for the club's members only, has become a nation-wide movement of the first magnitude.

What results are in store for the members of the paper industry are indicated by the case history of a large national organization. A short time ago this company felt that something definite could be done to combat the problem of rising selling costs and lowering profits. "Under the guidance of the Industrial Training Corporation executive, who is in charge of the coordination and application of our own training," said Mr. Richey. "this large national organization put into effect a sales training program comparable to the one being designed for the paper trade. Even before the training was completed the benefits were definitely manifest. And at the end of one year after the completion of the course the salesmen of this organization showed an average increase per man in sales and earnings slightly over 10 per cent. Some men showed only a 6 per cent increase, some as high as 40 per cent, *but every man showed an increase.* The average earnings per man increased—increased not proportionately, because earnings do not increase that way.

"They increased geometrically. Men that had been making $30 a week made $10 to $15 a week more. And some men that had been making $50 a week got into the real money class.

"With such precedent to go on, there is little doubt in the minds of the paper industry's leaders about the immediate and lasting benefits of our own program. Nobody regards the training as a cure-all. It is too much to expect that any business group or single organization can overcome all of their difficulties overnight. It is, however, a proven fact that many profit destroying factors can be eliminated through this concerted program.

"One of the most encouraging reactions received from the field is the question that is asked almost unanimously after the training and its anticipated results have been explained: 'I wonder why we haven't done something like this before?' "

Sulphite Paper Manufacturers To Meet

The Sulphite Paper Manufacturers Association will open its annual convention with a luncheon at 1 P.M. Monday afternoon, February 20, at the Waldorf-Astoria Hotel. D. Clark Everest, president of the American Paper and Pulp Association, will make an address which it is expected will strike the keynote for convention week.

As a large attendance is expected at this luncheon, it will be advisable to get in touch early with Thomas J. Burke, secretary-treasurer of the association for reservations.

Government Paper Bids

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., February 15, 1939—Barton, Duer & Koch Paper Company has been awarded the contract for furnishing the Government Printing Office with 55,000 pounds of calendered tag board in 23-1/4 inch rolls of which 30,000 pounds are yellow; 10,000 pounds salmon and 15,000 pounds green, at 7.73 cents. Bids for this paper were opened on January 30.

Barton, Duer & Koch Paper Company will also furnish 400,000 pounds of manila calendered tag board in 23-1/4 and 26-1/2 rolls and 40,000 pounds same in various weights at 6.73 cents per pound, bids for which were received on January 27.

R. P. Andrews Paper Company will furnish 780 pounds (3,000 sheets) of 26 x 40 buff antique cover paper, deckle edged at 18.25 cents, bids for which were received on January 18.

Barton, Duer & Koch Paper Company will also furnish 10,300 sheets of 25-1/2 x 30-1/2 white 8-ply railroad board at $41.35 per M sheets; and National Consumers Paper Company will furnish 5,000 pounds of No. 1 gummed kraft paper at 6.95 cents, bids for both of which were received on January 16.

Mathers-Lamm Paper Company will furnish 10,000 pounds (10,000 sheets) of 26 x 38, No. 50 strawboard at 4.3 cents, bids for which were received on January 9.

The Printing Office has received the following bids for 40,000 pounds (333,000 sheets) of 25 x 38 offset book paper; Aetna Paper Company, 5.81 cents; Howard Paper Company, 5.89 cents; and Maxwell Paper Company, 5.77 cents.

For 5,148 pounds (44,000 sheets) of 50 per cent rag, 24 x 38, litho finish map paper; Graham Paper Company, 12.54 cents; Baxter Paper Company, 10.23 cents; Stanford Paper Company, 10.69 cents; Barton, Duer & Koch Paper Company, 10.2 cents; Mathers-Lamm Paper Company, 10.35 cents; Mudge Paper Company, 10.62 cents; and Walker, Goulard Plehn Company, 10.75 cents.

Detroit Stokers

In Bulletins No. 840 and 834, just issued by the Detroit Stoker Company, General Motors Building, Detroit, Mich., the merits of the company's Rotostokers are described. It is stated that this equipment has distinct advantages of firing for burning certain coals and especially in handling fluctuating loads. Application of the Rotostoker to the paper industry is cited in installations at the mills of the Sutherland Paper Company, and at The Northwest Paper Company. Bulletin No. 140, describes the Multiple Retort stoker, of the underfeed type, designed for using nut, pea and slack or crushed run-of-the-mine coal in large boilers and high capacities.

Feedweight Equipment

In Bulletin No. 388, issued by the Merrick Scale Manufacturing Company, Passaic, N. J., the merits of the company's Feedweight equipment for feeding, proportioning and batching raw materials are described. Various sizes and capacities are supplied, usually as complete units, to handle chips, salt cake, etc. Installations in the paper industry include the St. Regis kraft mill at Tacoma, Wash., and the St. Joe Paper Company, Port St. Joe, Fla.

Mill Supply Dealers to Banquet

On Wednesday, February 22, the New York Association of Dealers in Paper Mills Supplies, Inc., will give its thirty-first annual banquet in the East Ballroom of the Hotel Commodore, New York. This event, which is always the highlight of the season for the paper stock trade in the metropolitan district, takes place during Paper Convention Week in New York when paper and board manufacturers from far and near will be in this city to attend the annual meetings of the trade groups.

Reservations for the banquet are going fast reports Walter H. Martens of Geo. W. Millar & Co., Inc., 284 Lafayette street, New York, chairman of the association's banquet committee, who is in charge of the reservations and tickets and who urges all who expect to attend to make their applications to him for tickets at once.

It is pointed out that this will be the only banquet in New York for the paper stock trade this Winter, as the National Association of Waste Material Dealers, Inc., holds its yearly convention in Chicago in March.

H. H. Dennison To Be Guest Speaker

H. H. Dennison, president of the Dennison Manufacturing Company, will be the guest speaker at the meeting Monday afternoon, February 20, of the National Paper Trade Association at the Waldorf-Astoria Hotel.

Mr. Dennison, as is well known, is a man of national reputation who takes a keen interest in public affairs and has a high sense of the responsibilities of business citizenship. He is widely known as a thoughtful student of national problems and an able and stimulating speaker.

This meeting will be open to manufacturers and guests. Other features of the opening session will be a presentation of the Paper Industry Sales Training Program, by Dr. Samuel N. Stevens, Dean of the University College, Northwestern University, and a report by A. W. Leslie, chairman of our committee, to cooperate with the Administrator of the Fair Labor Standards Act.

To Represent the Heppenstall Co.

C. P. Robinson has been appointed special sales representative by the Heppenstall Company. He will represent the company's line of chipper and trimmer knives used by the pulp and paper manufacturing industry. His offices will be at 420 Lexington avenue, New York. Mr. Robinson has been associated with this field for 30 years, both in management and sales. The Heppenstall Company, for 50 years manufacturers of shear knives for metal cutting, has recently begun supplying knives of special steel to pulp and paper makers.

Through the Ages With Paper

PHILADELPHIA, Pa., February 13, 1939.—How close the paper industry is to our daily lives was told last Thursday night by M. A. Wilhelm, production and traffic manager of the Schmidt & Ault Paper Company of York, to the members and guests of the York Traffic Club at a dinner in the Hotel Penn. C. R. Seeley, president of the Club, introduced Mr. Wilhelm who spoke on the subject "Through the Ages With Paper."

CONSTRUCTION NEWS

A Summary of Vital Facts Regarding Construction, Financing and Operation of Pulp and Paper Mills

General Construction News

Housatonic, Mass.—The Rising Paper Company, manufacturer of bond and other paper stocks, has completed plans for new addition to mill, to be two-story, 35 x 200 feet, reported to cost over $75,000, including equipment. Bids have been asked on general contract and work is schedule to be placed under way at early date.

Mobile, Ala.—The Hollingsworth & Whitney Company, 140 Federal street, Boston, Mass., manufacturer of bond and other writing paper stocks, kraft and fiber specialties, etc., has authorized immediate completion of plans for new pulp and paper mill at Mobile, where tract of over 200 acres of land, fronting on Mobile River and Chickasabogue Creek, was acquired from Alabama State Docks Commission a number of months ago. New mill will comprise several large one and multi-story units for pulp and paper-making divisions, with storage and distributing buildings, power house, pumping station, machine shop and other mechanical departments. Facilities will be provided for about 1000 persons. It is expected to begin erection early in the spring and have plant ready for service about 12 months later. It is estimated to cost close to $5,000,000, including machinery.

Jarratt, Va.—The Johns-Manville Corporation, 22 East Fortieth street, New York, N. Y., manufacturer of building board products, insulating materials, etc., has completed construction of new mill at Jarratt, previously referred to in these columns, and will place the plant in regular commercial operation at early date. It will be given over exclusively to the production of wood fiber specialties, including wall board, insulating board, etc., similar to that produced at mill of company at Oswego, N. Y. New mill is being equipped to manufacture about 100,000,000 square feet of such materials per annum. The plant consists of a one-story pulp building, 180 x 240 feet, connecting with a one-story dryer building, 44 x 520 feet, with finishing mill and storage building adjoining, one-story, 240 x 480 feet. A large wood storage building has been provided, as well as boiler house, pumping station and other mechanical units. The plant will give employment to about 300 persons and is reported to represent an investment of close to $1,000,000. Company also has purchased large tracts of timber lands in the vicinity of the mill for pulp wood supply. Erection contract has been carried out by Stone & Webster Engineering Corporation, 49 Federal street, Boston, Mass., which also designed the different buildings.

Detroit, Mich.—The Detroit Sulphite Pulp & Paper Company, 9125 West Jefferson street, manufacturer of bristol, bond, tissue and other paper stocks, has awarded contract for erection of new addition to mill to the W. C. J. Kaufmann Company, 10610 Shoemaker street, Detroit, instead of the Jacob Hoffman Construction Company, Detroit, as recently noted in these columns. Work on the new structure is being placed under way. It will be one-story, 100 x 100 feet, reported to cost close to $80,000, with equipment, which will provide for increased production facilities.

Jacksonville, Fla.—The United States Gypsum Company, 300 West Adams street, Chicago, Ill., manufacturer of wall board, insulating materials and other building specialties, has completed construction of new mill at Jacksonville, in course of erection for a number of months, and will place in regular commercial operaiton at early date. It consists of a large production unit and a number of auxiliary buildings, with reported investment totaling close to $1,000,000.

Cincinnati, Ohio—The Jackson Box Company, 4927 Beech avenue, Norwood, manufacturer of corrugated paper boxes and containers, has approved plans for expansion and improvements in plant, including erection of new one-story addition, 86 x 263 feet, and alterations in present plant unit. General contract has been awarded to the Austin Company, 16112 Euclid avenue, Cleveland, Ohio, and work is scheduled to begin at early date. Cost estimated over $50,000, including equipment.

Camas, Wash.—The Crown-Willamette Paper Company, Camas, manufacturer of book, kraft, tissue and other paper stocks, has plans under way for new laboratory at mill, to be one story, 44 x 120 feet, designed to provide two laboratory units, instrument room, humidity control division, photographic dark room and other technical departments. It is estimated to cost in excess of $45,000, including equipment. Bids will be asked soon on general contract. Company is a division of the Crown-Zellerbach Corporation, 343 Sansome street, San Francisco, Cal.

Kansas City, Mo.—The Agar Manufacturing Corporation, Thomas street, Whippany, N. J., manufacturer of corrugated boxes and containers, will build four main units for new plant in Greater Kansas City district, instead of three buildings, as recently announced in these columns. Structures will include a main one-story manufacturing unit, 150 x 400 feet; one-story corrugating stock building, 60 x 320 feet; one-story storage and distributing building, 150 x 400 feet, including boiler house section, 40 x

60 feet; and office structure 40 x 102 feet. It is estimated to cost over $100,000, including equipment. Bids have been closed on general erection contract and it proposed to begin actual erection at early date.

New York, N. Y.—The Dix Rubin Paper Box Company, 127 Mercer street, manufacturer of paper boxes and containers, has leased a floor in building at 179 Wooster street, and will occupy for plant. It is understood that present plant will be removed to new location.

Muskegon, Mich.—The Central Paper Company, Inc., manufacturer of parchment, kraft and other paper stocks, is considering expansion in different departments of mill. Company recently has placed an order for a new turbine unit for power house at plant, and will carry out installation in the spring, to increase capacity of station. It is proposed to install a converter machine for asphalt coating of paper stocks, making the second such unit at mill. Other equipment installation also is under consideration. Entire project is reported to cost in excess of $80,000. The company is now giving employment to more than 500 persons in different operating divisions.

Portland, Ore.—The Chase Bag Company, 155 East 44th street, New York, N. Y., manufacturer of paper bags and containers, will push construction of new branch plant at Portland to early completion, and expects to have the units ready for production in the spring. As previously noted in these columns, it will be one-story, totaling approximately 60,000 square feet of floor space, and will represent an investment of close to $100,000, with equipment. Erection contract is being carried out by Austin Company, 16112 Euclid avenue, Cleveland, Ohio. New plant will be equipped to provide for company trade throughout the Portland area.

Lenoir, N. C.—The Hinde & Dauch Paper Company, Decatur street, Sandusky, Ohio, manufacturer of corrugated boxes and containers, has leased property at Lenoir, and will improve and equip at once for new branch plant. It is proposed to have unit ready for production at early date. Facilities will be provided for sizable output. Company branch at 3400 East Biddle street, Baltimore, Md., is in charge of project.

Syracuse, N. Y.—Fire recently damaged a portion of warehouse of the Goldberg Waste Paper Corporation, 812 South State street, with loss reported in excess of $10,000. It is planned to rebuild at early date.

Middletown, Ohio—The Interstate Folding Box Company, Liberty avenue, manufacturer of folding and other paper boxes and containers, is completing work on a new one and two-story addition, aggregating about 28,000 square feet of floor space, previously referred to in these columns, and will place unit in service at early date. It will be used for increased capacity. Entire project will represent an investment reported close to $75,000, with equipment.

Kalamazoo, Mich.—The Sutherland Paper Company, manufacturer of boxboard, paper board, coated stocks, etc., has completed construction of a new addition to mill, in progress for several months past, and will proceed at once with installation of machinery and equipment. The new unit will be used for the manufacture of finished paper board specialties, including paper plates, pails and allied products. It is scheduled to be ready for service in March and will be operated in conjunction with four other mills of the company, relieving present congestion in these units. New mill will represent an investment of approximately $200,000, including equipment.

Brantford, Ont.—The Sonoco Products Company of Canada, Ltd., Park avenue, East, manufacturer of paper board products of various kinds, is considering construction of large one-story addition to mill, to provide for sizable increase in present capacity. It is proposed to carry out erection early in the spring. No estimate of cost has been announced. R. J. Fletcher is general manager, in charge.

St. John, N. B.—The proposed new plant of the Canadian Bag Company, Ltd., 2485 St. Patrick street, Montreal, Que., at St. John, where a former industrial works has been acquired, will be used for the production of jute and cotton bag products, and not paper containers, as incorrectly noted in these columns last week.

New Companies, Etc.

New York, N. Y.—Thervac Products, Inc., has been chartered with capital of 200 shares of stock, no par value, to deal in paper goods of various kinds. New company is represented by Joseph Allentuck, 152 West Forty-second street, New York, attorney.

Carson City, Nev.—The American Fiber Company has been incorporated with capital of 250,000 shares of stock, no par value, to manufacture fiber products and allied specialties. The incorporators include William Muller, G. V. Lamb and A. M. Peters, all of Carson City.

Hartford, Conn.—Fine Paper, Inc., has filed a preliminary certificate of company dissolution under state laws. Sidney B. Bernheim, 18 Asylum street, Hartford, is in charge of company affairs.

New York, N. Y.—The Paragon Paper & Twine Corporation has been organized with capital of $20,000, to deal in wrapping papers and kindred paper stocks. New company is represented by Harry Meismers, 347 Madison avenue, New York, attorney.

J. W. Ward to Represent I. P.

Joseph M. Ward recently assumed new duties as representative of the International Paper Company in the sale of cores, caps and mill wrappers for the middlewest territory — establishing headquarters at Merrill, Wis.

He has been with the paper industry for the last twenty years. Formerly Mr. Ward was associated with the manufacturing end of the industry with Detroit Sulphite Pulp and Paper Company and the Ward Paper Company. He has also been active in association work as president of the Old Sulphite Paper Manufacturers association for many years. No doubt his friends in the industry will be glad to be informed of his added responsibilities.

Japan Decreases Wood Pulp Production

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., February 14, 1939—Production of wood pulp by members of the Japan Paper Manufacturers' Association during the third quarter of the current year reached a total of 204,033 short tons, a decrease of nearly 8 per cent compared with the amount turned out during the third quarter of 1937. Wood pulp production during the first 9 months of the current year amounted to 584,559 tons, a decline of 6½ per cent from the corresponding total in 1937, but a gain of 5½ per cent over the amount produced during the first 9 months of 1936.

PAPER TRADE
ESTABLISHED 1872
JOURNAL

Reg. U. S. Pat. Off.

George S. Macdonald, Pres. *Joseph P. Horgan, Secy.*
Executive and Editorial Offices, 15 West 47th St., New York, N. Y.

Henry J. Berger
EDITOR

Ronald G. Macdonald
Editor Technical Section

Lynne M. Lamm
Washington Correspondent

Per Copy, 10 cents
United States, Per Annum, $4.00
Canada and Foreign Countries in Postal Union, $6.00

Member Audit Bureau of Circulations

Vol. CVIII New York, February 16, 1939 No. 7

COMING EVENTS IN PAPER INDUSTRY

AMERICAN PAPER AND PULP ASSOCIATION, Sixty-second Annual Convention and meeting, Waldorf-Astoria Hotel, New York. February 20-24.

TECHNICAL ASSOCIATION OF THE PULP AND PAPER INDUSTRY, Convention, Roosevelt Hotel, February 20-23.

SALESMEN'S ASSOCIATION OF THE PAPER INDUSTRY, Annual Meeting and Luncheon, Waldorf-Astoria Hotel, New York, Tuesday, February 21.

NATIONAL PAPER TRADE ASSOCIATION OF THE UNITED STATES, Convention, Waldorf-Astoria Hotel. New York. February 20-22.

NEW ENGLAND SECTION. Technical Association of the Pulp and Paper Industry—Third Friday of each month at the Roger Smith Hotel, Holyoke, Mass.

DELAWARE VALLEY SECTION. Technical Association of the Pulp and Paper Industry—Second Friday of each month at the Engineers Club, Philadelphia, Pa.

LAKE STATES SECTION. Technical Association of the Pulp and Paper Industry—Second Tuesday of each month at the Conway Hotel, Appleton, Wis.

KALAMAZOO VALLEY SECTION. Technical Association of the Pulp and Paper Industry—First Thursday of each month at the Park, American Hotel, Kalamazoo, Mich.

THE WAGNER ACT

The National Labor Relations Act, popularly known as the Wagner Act has been a subject of controversy since it was passed in 1935. The decisions of the National Labor Relations Board have also been frequently and severely criticized as arbitrary, as favoring labor in general and the C.I.O. in particular and as unjustly discriminating against the employer. From the mass of conflicting claims and counter-claims which have been presented to the public in the past two years, it is difficult to form a fair and honest opinion on this hotly contested law. But, the fact that the Wagner Act has provoked so much dissension, not only among employers and their employees, but also among the A.F. of L. which condemns it, and the C.I.O. which would not change it, there is apparent need for some amendment to clarify the Act as it is now enforced.

In a dual presentation of conflicting viewpoints over the radio on January 29, Charles R. Hook, chairman of the National Association of Manufacturers, declared the Wagner Act a source of strife and inequity. In defending the policies of the Labor Board, J. Warren Madden, chairman of the National Labor Relations Board asserted the Act restored the rights of the workers. In charging the Act was unfair in terms of law, Mr. Hook said in part: "The Act throughout is set up to protect the rights of organized employees. But in no place does it protect the rights of employers or the basic rights of unorganized employees or minority groups of employees. A law which because of inequitable provisions is a poor law may be improved by constructive and impartial administration. The National Labor Relations Board might have done much to convert a poor law into a reasonably good and fair law.

"After the passage of the Act, waves of strikes continued. Certain labor unions adopted a new weapon, the sit-down strike, which is kidnapping a plant and holding it for ransom. Business recovery was adversely affected. The labor strife of 1937 must go down as one of the major causes for the precipitous decline of business activity in that year. The National Labor Relations Act and its administration are being judged on that basis by the public, which has been the most serious sufferer. When industry criticizes the Act or its administration it is made the subject of charges that it is unalterably opposed to collective bargaining. I want to say that such charges are not true. Let me read to you industry's position on collective bargaining as unanimously adopted at the recent Congress of American Industry.

" 'Industrial management recognizes that employees who wish to bargain collectively are entitled to do so, in whatever form they determine, through their own freely chosen representatives, and without intimidation or restraint from any source.' I would like to put particular emphasis on the last phrase in that statement, 'without intimidation or restraint from any source', for one of the basic faults of the National Labor Relations Act, as drafted and as interpreted, is that it does not recognize this fundamental principle. The obvious thing to do is to amend the Wagner Act so as to correct its one-sided character: to separate the functions of fact-finding, prosecution and judicial decision; and to do everything that Congress can do to guarantee impartial administration."

In asserting that the "scales are still heavily weighted against labor," Mr. Madden said in part: "During the more than three years of our existence approximately 20,000 cases have been brought to the Board's offices in the 22 regions into which the country is divided. Some of these cases have involved thousands of workmen, some only a few. About 8,000 of them have been closed by agreement of both parties. About 2,500 have been dismissed as lacking in merit. About 4,000 have been withdrawn by the unions filing the charge or petition, because they were advised by the Board that the case lacked

merit or for some other reason. About 1,000 have been closed in other ways, such as compliance with Board decisions or intermediate reports and certifications after elections. In 1936 and the first four months of 1937, the number of strikes in the country exceeded the number of Board cases. Beginning the month after the Supreme Court decisions and continuing to today, the proportion has changed so that there are now about four times as many Board cases as there are strikes. The processes of law are displacing the remedy of self-help, which was the express aim and purpose of the statute."

In introducing a measure in the Senate on February 9, Senator Edward R. Burke, democrat from Nebraska, proposed to curtail the powers of the Board and would constitute it to provide one representative each of employee, employer and the public. In addition to changes in the Board, Senator Burke's amendments were as follows: (1) Permit any respondent cited by the Board as a violator of the law to petition for removal of his hearing directly to the United States District Court. (2) Permit either employees or employers to petition for an election to determine the collective bargaining representative; a secret ballot within 20 days after receipt of the petition would be mandatory. (3) Grant to employees the right to bargain collectively. (4) Define as unfair labor practice any act that intimidates worker or that interferes with the orderly conduct of an employer's business. (5) Require labor organizations to file information regarding themselves. (6) Grant employers the right to counsel or advise his employees. (7) Substitute 'Remedial severence pay' for the practice of 'reinstatement of employees against the will of the employer'."

Proposed changes in the election machinery of the Board, Senator Burke said, were based on complaints "commonly made that the board refuses to call an election until it is assured by Congress of industrial leaders that they are in control."

Production Year Book

The fifth edition of the "Advertising and Publishing Production Year Book", has just been published by the Colton Press, Inc., 114 East 32nd street, New York. This annual, consisting of 425 pages and many illustrations, covers all the important divisions of the graphic arts, such as printing, engraving, paper, etc., and comprises a useful reference work. Of particular interest to the paper industry are the articles on the classifications of different grades of book, bond and cover papers and bristol board. There are some 15,168 items on paper in the Munder Chart, with 948 papers represented from 92 mills, together with cost factors on estimating, selecting, and a large amount of information for advertising men and all others interested in the modern technique and practices in the production of display, book, and letterpress printing of every kind.

The price of the book is $5 a copy.

Production Ratio Report

These statistics are based upon paper production reports to the American Paper and Pulp Association.

COMPARATIVE MONTHLY SUMMARIES

Months	1939 (c)	1938 (c)	1937 (c)	1936	1935	1934
January	77.4%	63.9%	90.3%	76.1%	65.8%	.....
February	.....	68.7	90.1	77.9	70.0	.....
March	.....	69.6	90.3	76.0	70.5	.....
April	.....	68.3	92.1	82.3	70.0	.....
May	.....	69.0	90.6	81.6	69.4	.....
June	.....	66.0	87.3	80.7	72.3	.....
July	.....	72.0	81.8	77.3	64.9	.....
August	.....	77.2	82.9	81.5	70.9	.....
September	.....	76.3	78.6	80.5	71.9	58.2%
October	.....	82.5	73.5	87.6	75.6	64.7
November	.....	79.6	61.9	88.0	75.3	61.7
December	.....	74.4	54.5	85.9	71.2	59.6
Year Average	.....	72.3	80.6	81.3	70.5	.....
First 5 weeks	77.7	64.5	89.9	76.4	65.8	.....

COMPARATIVE WEEKLY SUMMARIES

Current Weeks		Corresponding Weeks	
*December 31, 1938	62.8%	January 1, 1938	47.0%
*January 7, 1939	69.9	January 8, 1938	59.2
*January 14, 1939	80.3	January 15, 1938	62.3
*January 21, 1939	78.2	January 22, 1938	66.0
*January 28, 1939	81.3	January 29, 1938	68.1
*February 4, 1939	79.4	February 5, 1938	67.1

The following statistics show the number of mills reporting by ratio groups:

NUMBER OF MILLS REPORTING, CURRENT WEEKS

Ratio Limits	Dec. 31, 1938	Jan. 7, 1939	Jan. 14, 1939	Jan. 21, 1939	Jan. 28, 1939	Feb. 4, 1939
0% to 50%	118	91	64	63	61	48
51% to 100%	191	216	238	234	224	159
Total Mills Reporting	309	307	302	297	285	207

* Subject to revision until all reports are received.
(c) Basic capacity data have been adjusted to correspond with ratings reported by individual companies.

PAPERBOARD OPERATING RATIOS

According to reports from the National Paperboard Association, per cents of operation, based on "Inch-Hours," were as follows:

Months	1938 (e)	1937 (e)	1936	1935	Months	1938 (e)	1937 (e)	1936	1935
January	55%	80%	61%	61%	July	57%	67%	69%	59%
Feb.	61	86	67	67	August	66	74	75	65
March	60	87	68	67	Sept.	66	70	76	69
April	57	89	70	61	Oct.	70	66	82	76
May	58	86	68	61	Nov.	64	56	79	70
June	56	75	68	65	Dec.	58	46	74	60

Week end. Dec. 31, 1938—35%
Week end. Jan. 7, 1939—45%
Week end. Jan. 14, 1939—62%
Week end. Jan. 21, 1939—63%
Week end. Jan. 28, 1939—68%
Week end. Feb. 4, 1939—66%

(e) Basic figures revised to include new members of the National Paperboard Assn.

To Issue Booklet on Paper Boxes

Work has been begun on a trade promotional publication dealing with folding paper boxes and folding boxboard by the Pulp and Paper Section of the Forest Products Division of the Department of Commerce, Washington, D. C. This booklet will be the first in a series of trade promotional publications on paper issued by the Forest Products Division. Eventually it is hoped that the series may cover not only set-up boxes and fiber shipping containers, but many of the other converted products such as paper cups, paper bags, etc., as well. The series might be extended to include publications on cover paper, wrapping paper, writing paper, tissue paper and others of the primary items. Consideration is given to requests for publications when made by the association representing the product or by any group representing 75 per cent or more of production. An Advisory Committee of from three to five members will be set up soon to pass upon the manuscript and to otherwise render constructive assistance.

The Folding Paper Box Association of America has approved the project.

In Cyanamid's modern Research Laboratories at Stamford, Conn., new chemical products and new uses for old products are being developed for industries of today and tomorrow.

CYANAMID OFFERS

SULPHATE OF ALUMINA

SIZING MATERIALS

Liquid Rosin Size in tank cars and drums. Dry Size in bags.

CASEIN

TAPIOCA

SAGO FLOUR

American Cyanamid & Chemical Corporation

30 ROCKEFELLER PLAZA, NEW YORK, N. Y.

Section of the
Technical Association of the Pulp and Paper Industry

Edited by Ronald G. Macdonald, Secretary

Composition of Holocellulose, Hydrolized Holocellulose and Cross and Bevan Cellulose*

By Wm. G. Van Beckum [1] and Geo. J. Ritter [2]

A report of work made possible through cooperation between the Technical Association of the Pulp and Paper Industry and the Forest Products Laboratory was given at the 1937 fall meeting of the Association. The report described the development of a rapid, quantitative method for isolating holocellulose from wood and also a rapid, quantitative method of hydrolyzing holocellulose to a fraction comparable in yield to Cross and Bevan cellulose. The results obtained in isolating the two cellulosic fractions were encouraging. As a consequence, the members of the TAPPI Fibrous Materials Testing Committee requested that the cooperation be continued in order to determine the composition of the holocellulose, the hydrolyzed holocellulose, and also the Cross and Bevan cellulose. The results obtained during the school year of 1937-38 on the composition of the three cellulosic fractions are presented in this paper

The three cellulosic fractions were isolated from aspen, balsam fir, eastern hemlock, jack pine, red spruce, and white spruce. These are the same species that were recommended by TAPPI for use in developing the two previously mentioned analytical procedures.

Experimental

Holocellulose and hydrolyzed holocellulose were isolated by the method developed by Van Beckum and Ritter *(12)*. Cross and Bevan cellulose was isolated by the Cross and Bevan method as modified by Ritter. *(11)*. As will be seen later, one phase of the work called for analyses of the six woods employed in the study. The work naturally required a large number of analyses which were made according to the following methods: Alpha cellulose was determined according to the method of the American Chemical Society *(1)*; pentosans were determined by the Tollens method *(3)* and the steam-distillation method *(9)*; acetyl was determined by a modification of Clark's procedure *(4)*; uronic acid was determined according to the procedure of Dickson, Otterson, and Link *(6)*; methoxyl was determined by the method of Viebock and Schwappach *(5)*; and lignin was determined by the method proposed by Ritter and Barbour *(10)*.

The analytical results have been arranged in three tables so as to point out some chemical characteristics of the three cellulosic materials.

Holocellulose.—The results in Table I are listed to show what percentages of some constituents and substituent groups in the wood are associated with the holocellulose. Values in column 2 show that the

* Report of work supported in part by a research grant from the Technical Association of the Pulp and Paper Industry and carried out with the cooperation of the TAPPI Fibrous Materials Testing Committee. Paper presented before the fall meeting of TAPPI, Green Bay, Wis., September 8, 1938.

[1] Member TAPPI, Student Assistant, Forest Products Laboratory, Madison, Wis.

[2] Senior Chemist, Forest Products Laboratory, Madison, Wis.

TABLE I.—DISTRIBUTION OF SOME WOOD CONSTITUENTS AND SUBSTITUENT GROUPS IN HOLOCELLULOSE
(Results based on oven-dry (105 deg. C.) weight of extractive-free wood)

Material	Yield	Lignin	Pentosan		Uronic acid anhydride ($CO_2 \times 4$)	Acetyl	Methoxyl
			Tollen's method	Steam distillation method			
1	2	3	4	5	6	7	8
	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent
Extractive-free aspen	...	17.3	23.5	...	4.28	4.65	5.54
Aspen holocellulose	82.5	0.0	23.3	...	4.16	4.53	.93
Extractive-free balsam fir	...	30.1	10.3	...	3.08	2.24	4.35
Balsam fir holocellulose	69.9	0.0	10.2	...	3.08	2.21	.41
Extractive-free eastern hemlock	...	31.5	10.0	10.3	3.40	1.87	5.62
Eastern hemlock holocellulose	68.5	0.0	6.1	8.2	3.36	1.85	.84
Extractive-free jack pine	...	27.2	12.8	13.2	2.92	1.92	5.41
Jack pine holocellulose	72.5	0.0	10.9	12.2	2.92	1.92	.75
Extractive-free red spruce	...	26.6	11.6	12.0	3.20	2.50	5.30
Red spruce holocellulose	72.9	0.0	9.5	11.0	3.16	2.34	.92
Extractive-free white spruce	...	26.6	10.9	11.3	2.68	2.35	5.17
White spruce holocellulose	73.3	0.0	9.0	10.6	2.68	2.34	.70

holocellulose yield from aspen ranges from 9.2 to 14.0 per cent higher than those from the softwoods. In contrast the lignin content of aspen as shown in column 3 is from 9.3 to 14.2 per cent lower than that of the softwoods. Thus it is evident from these data on aspen and other data in columns 2 and 3 that a decreasing lignin yield is concomitant with an increasing holocellulose yield. The results are a confirmation of previously published findings *(2, 7, 8, 12)*.

Pentosans.—The pentosan values in column 4 were obtained by Tollen's method. The values for the extractive-free wood and the corresponding holocelluloses are in close agreement for both aspen and balsam fir. On the other hand, a discrepancy occurs between the pentosan content of the extractive-free wood and the holocellulose of each of the last four woods in the table. The discrepancy is 3.9 per cent for eastern hemlock, 1.9 per cent for jack pine, 2.1 per cent for red spruce, and 1.9 per cent for white spruce. An attempt was made to find the cause for the losses.

In the early part of the distillation, furfural is formed more rapidly from holocellulose than from the corresponding wood. The furfural is removed from the distillation flask more promptly by the steam-distillation method than by Tollen's method *(9)*. The steam-distillation method was therefore applied to the last four woods and the corresponding holocelluloses. The pentosan values are recorded in column 5.

The differences encountered by Tollen's method, between the pentosan yield from wood and holocellulose, were reduced about one-half by the steam-distillation method. This method increased the pentosan yields of wood only 0.3 to 0.4 per cent and those of the corresponding holocelluloses 1.3 to 2.1 per cent over the corresponding values obtained by Tollen's method. It then seems that some of the furfural is lost, even by the steam-distillation method. The contrast between the increased pentosan yields from the holocellulose and the wood as produced by steam distillation indicates a difference, either in chemical composition or combination between the furfural-yielding substances from these two materials.

There is also a color effect that indicates a difference between the furfural-forming materials in the wood and the holocellulose. The supernatant liquid over the furfural-phloroglucide precipitate is brown if the pentosan determination is being made on wood, whereas it is green if the determination is being made on holocellulose. However, it should not be inferred that no brown color-forming material is present in the supernatant liquid obtained during the determination of pentosan in holocellulose. If the distillate is collected in four 90-cc. fractions and phloroglucinol added to each, a brown color develops in the last two fractions of the distillate. This brown color is insufficient, however, to mask the green when the four fractions of the distillate are mixed. The relative proportion of the brown coloring matter from wood and holocellulose show that in the case of the last four holocelluloses there is some destruction of the coloring material. The colored material so destroyed might be a contributing factor for the low pentosan yields in the holocellulose.

The observations on color-forming material and rate of furfural liberation indicate that more work is required on the nature of the furfural-forming substances in wood and its corresponding holocellulose.

Uronic acid and acetyls.—All the uronic acids and acetyl groups in wood are contained in the holocellulose as shown in columns 6 and 7. The results agree with those of previous studies by Kurth and Ritter *(7, 8)* and Bird and Ritter *(2)*.

Methoxyl.—A constituent of wood common to both the holocellulose and the lignin is the methoxyl group. From 9 to 17 per cent of the methoxyl in the wood is associated with lignin. The findings on methoxyl are in accord with those obtained in previous studies *(2, 7, 8)*.

Yields.—The data recorded in Table II take into account both the yield and the composition of holocellulose, hydrolyzed holocellulose, and Cross and Bevan cellulose obtained on a laboratory scale from six commonly used pulp woods.

The holocellulose, which is isolated by the mildest procedure of the three, naturally constitutes the highest percentage of the wood. The hydrolyzed holocellulose has gone through two chemical treatments in contrast to one for the Cross and Bevan cellulose. It has been subjected to the delignification treatment for isolating the holocellulose plus a mild acid hydrolysis to obtain the lower cellulosic fraction. The additive effect of the two treatments is approximately as severe as that required for isolating the Cross and Bevan cellulose, as is shown by the uniformity in yields of the two cellulosic fractions.

Acid hydrolysis with 1.3 per cent sulphuric acid solution was the main chemical treatment used for removing some of the cellulosic material so as to obtain the hydrolyzed holocellulose; an alkaline hydrolysis, with 2.0 per cent sodium sulphite solution,

TABLE II.—RESULTS OF ANALYSES OF HOLOCELLULOSE, HYDROLYZED HOLOCELLULOSE, AND CROSS AND BEVAN CELLULOSE

Material	Basis oven-dry wood Yield	Results based on oven-dry (105 deg. C.) material: Alpha cellulose	Pentosan Tollen's method	Uronic acid anhydride ($CO_2 \times 4$)	Acetyl	Methoxyl
1	2	3	4	5	6	7
	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent
Aspen holocellulose	82.5	61.4	28.2	5.04	5.53	1.13
Hydrolyzed holocellulose	63.7	74.3	15.9	2.60	3.07	.70
Cross and Bevan cellulose	64.1	76.3	19.9	2.64	1.61	.52
Balsam fir holocellulose	69.9	63.0	14.5	4.28	3.18	.58
Hydrolyzed holocellulose	55.3	70.9	7.1	1.96	2.06	.53
Cross and Bevan cellulose	56.4	70.7	6.0	1.92	1.40	.54
Eastern hemlock holocellulose	68.5	70.4	8.9	4.88	2.70	1.23
Hydrolyzed holocellulose	55.4	75.2	5.5	1.92	1.76	.48
Cross and Bevan cellulose	56.0	77.1	4.6	1.88	1.94	.33
Jack pine holocellulose	72.5	68.3	15.0	4.00	2.68	1.04
Hydrolyzed holocellulose	59.1	73.0	8.8	1.84	1.68	.69
Cross and Bevan cellulose	58.3	74.1	6.8	1.88	1.76	.73
Red spruce holocellulose	72.9	66.2	13.0	4.36	3.21	1.25
Hydrolyzed holocellulose	60.5	71.6	7.6	2.00	1.40	.49
Cross and Bevan cellulose	60.3	72.0	6.7	2.04	1.51	.42
White spruce holocellulose	73.3	67.5	12.2	3.64	3.19	.96
Hydrolyzed holocellulose	61.0	71.7	6.9	1.84	1.59	.45
Cross and Bevan cellulose	61.2	72.9	6.2	1.92	1.61	.43

was the main treatment used for removing some of the cellulosic material so as to obtain the Cross and Bevan cellulose. The two treatments were so carefully controlled as to obtain approximately the same yields of the two cellulosic fractions.

Alpha cellulose.—Aspen holocellulose contains about 14.0 per cent less alpha cellulose than do the corresponding hydrolyzed holocellulose and the Cross and Bevan cellulose; the holocellulose from balsam fir contains about 8.0 per cent less alpha cellulose than do the corresponding hydrolyzed holocellulose and the Cross and Bevan cellulose; and it contains approximately 5.0 per cent less alpha cellulose than the hydrolyzed holocellulose and the Cross and Bevan cellulose from the other four woods. The alpha cellulose content varies from 1.0 to 2.0 per cent between the hydrolyzed holocellulose and the Cross and Bevan cellulose from the six woods listed in Table II.

Pentosans.—Holocellulose contains approximately 4.0 to 10.0 per cent more pentosans than either the Cross and Bevan cellulose or the hydrolyzed holocellulose. According to unpublished results, the high percentages of pentosan suggest that holocellulose should hydrate and fibrillate somewhat more easily than the other two wood fractions. A difference is found between the pentosan content of the hydrolyzed holocellulose and the Cross and Bevan cellulose. The difference is about 4.0 per cent between the aspen cellulosic fractions, 2.0 per cent between the jack pine cellulosic fractions, and 1.0 per cent between the cellulosic fractions from the other four woods.

Uronic acid.—Uronic acids constitute approximately 2.0 to 2.5 per cent more of the holocellulose than of the other two cellulosic fractions. Marked similarity prevails between the uronic acid content in the last two cellulosic fractions.

Acetyls.—Acetyls constitute from 1.0 to 2.5 per cent more of the holocellulose than of the other two cellulosic fractions from the same wood. A difference is shown between the acetyl content of the hydrolyzed holocellulose and the Cross and Bevan cellulose from both aspen and balsam fir. Close agreement is found, however, between the acetyl content of these two cellulosic fractions from the other four woods.

Methoxyls.—The methoxyl content of the holocellulose is higher than that of the hydrolyzed holocellulose and the Cross and Bevan cellulose. A difference is noted between the methoxyl content of the hydrolyzed holocellulose and the Cross and Bevan cellulose from both aspen and eastern hemlock, whereas the methoxyl values for the same cellulose fractions from the other four woods are in accord.

There is, then, close agreement between the yields of hydrolyzed holocellulose and the Cross and Bevan cellulose, but there is a difference between the pentosan content of the two cellulosic fractions.

TABLE III.—ALPHA CELLULOSE CONTENT OF CELLULOSE FRACTIONS

(Percentages expressed on weight of oven-dry (105 deg. C.) extractive-free wood)

Species	Holocellulose	Cross and Bevan cellulose	Hydrolyzed holocellulose	Pulp
1	2	3	4	5
	Per cent	Per cent	Per cent	Per cent
Aspen	50.7	48.3	47.3	42.3 (Bleached soda)
Balsam fir	44.0	39.8	39.3	...
Eastern hemlock	48.2	43.2	41.7	34.8 (Sulphite)
Jack pine	49.5	43.2	43.1	36.1 (Sulphate)
Red spruce	48.3	43.4	43.3	...
White spruce	49.5	44.6	43.7	39.8 (Bleached sulphite)

It is of interest to know the percentage of cellulosic fractions obtainable from wood. In addition, it is important to know what percentage of the alpha cellulose existing in the wood can be recovered from the cellulosic fractions. The latter type of data is recorded in Table III.

The table shows that the alpha cellulose content of holocellulose is from 2.4 to 6.3 per cent higher than that of the corresponding Cross and Bevan cellulose and the hydrolyzed holocellulose. When a comparison is made between alpha cellulose in holocellulose and that in the corresponding pulp, the difference is even greater, amounting to 13.4 per cent in the case of eastern hemlock and jack pine. This difference of 13.4 per cent indicates that 27 per cent of the available alpha cellulose in wood is lost by the ordinary pulping methods. The loss may be even greater since it is possible that some alpha cellulose in the wood has been degraded during the isolation of the holocellulose.

Summary

Experimental data show the distribution of some wood constituents and substituent groups in holocellulose. Some contrasts observed during the pentosan determination suggest a difference between the stability, to hydrochloric acid, of the hemicellulosic portion of some woods and the corresponding holocelluloses.

Holocellulose can be hydrolyzed to a cellulosic fraction comparable in yield with Cross and Bevan cellulose, but differing in pentosan content.

On the basis of the wood, holocellulose contains from 2 to 6 per cent more alpha cellulose than the hydrolyzed holocellulose or the Cross and Bevan cellulose. Further, holocellulose contains 13.4 per cent more alpha cellulose than does the corresponding pulp on the basis of the wood.

Literature Cited

(1) American Chemical Society, *Ind. Eng. Chem.* 1:52 (1929).
(2) Bird, C. D. and Ritter, Geo. J. *J. Am. Chem. Soc.* 59:802-3 (1937).
(3) Bray, M. W. *Paper Trade J.* 87:59 (1928).
(4) Clark, E. P. *Ind. Eng. Chem. (anal. ed.)* 8:487 (1936).
(5) Clarke, E. P. *J. Assoc. Official Agric. Chemists* 15:136 (1932).
(6) Dickson, A. D., Otterson, H., and Link, K. P. *J. Am. Chem. Soc.* 52:775 (1930).
(7) Kurth, E. F. and Ritter, Geo. J. *Ind. Eng. Chem.* 25:1250 (1933).
(8) Kurth, E. F. and Ritter, Geo J. *J. Am. Chem. Soc.* 56:2720 (1934).
(9) Pervier, N. C. and Gortner, R. A. *Ind. Eng. Chem.* 15:1167-9 (1923).
(10) Ritter, Geo. J. and Barbour, J. H. *Ind. Eng. Chem. (anal. ed.)* 7:238 (1935).
(11) Ritter, G. J. *Ind. Eng. Chem.* 16:947 (1924).
(12) Van Beckum, W. G. and Ritter, Geo. J. *Paper Trade J.* 105(18):127-30 (1937).

TAPPI Notes

Sven Fahlgren, formerly Chief Chemist and Chemical Engineer of the International Paper Company mill at Tonawanda, N. Y., is now sales engineer for A. Ekstroms A/B Maskinaffar, Stockholm, Sweden.

John H. Noble, vice-president of the Improved Paper Machinery Company, Nashua, N. H., is recovering from an appendicitis operation at the Physicians Hospital of Plattsburg, N. Y.

L. A. Hawkins, executive engineer of the General Electric Company, will be the principal speaker at the TAPPI annual luncheon, Thursday, February 23, at the Roosevelt Hotel, New York, N. Y.

The Kalamazoo Valley Section of TAPPI will meet at the Park American Hotel, Kalamazoo, Mich. Thursday, March 2, 1939.

39-10

The Sulphite Pulping of Douglas Fir*

By E. B. Brookbank, Jr.[1]

Abstract

Since it has been estimated that the amount of Douglas fir slabwood cut per annum is equal to about 2,000,000 tons of pulp, and since this slabwood is from 90 to 95 per cent sapwood, successful pulping of this waste would open up a new source of raw material to Pacific Coast pulp mills. The sample of wood used contained 17 growth rings per inch in the heartwood and 38.5 in the hardwood. The sapwood constituted 15 per cent by volume and 20 per cent by weight of the entire log.

The sulphite cooking liquor contained 1.25 per cent combined and 6 per cent free sulphur dioxide. The liquor ratio used was 7 to 1. Cooking conditions were selected so as to keep the action as mild as possible and to allow a fairly long period at moderate temperatures for penetration and sulphonation before raising the temperature to the maximum value. It was found that sapwood and a mixture of 85 per cent sapwood and 15 per cent heartwood by weight (representative of slabwood) could be pulped in ten hours at 140-145 deg. C. Because of their unusual physical properties, the application of Douglas fir pulps offers some interesting possibilities. The high tear and low apparent density indicate their use in building properties into a sheet which are not attainable with the pulps now on the market. While the color of the unbleached pulps will probably limit their use to those grades where color is not important, such as wrapping and deeply dyed cover stock, the bleached pulps might well be applied to such grades as toweling, bond, printing, mimeo, and various specialties. The unusual chemical properties of high alpha-cellulose and low pentosans suggest the application of these pulps to the manufacture of cellulose derivatives. The chemical data indicate that the purification of these pulps would be less expensive than that of pulps lower in alpha-cellulose.

The pulping of Douglas fir (*Pseudotsuga taxifolia* Britt.) has been of interest to many investigators; one of the principal reasons for this interest is the tremendous amount of wood which occurs along the Pacific coast in British Columbia, Washington, Oregon, Idaho, and northern California. At present, the lumber industry is the sole consumer of this species, and, because of the large size of the trees, much wood is lost as slabs which are either burned or put through expensive cutting operations in making such articles as laths and broom handles. Greeley *(1)* in 1928 estimated the amount of slabwood available for pulping from this region as 4,000,000 units of chips (1 unit = 200 cu. ft.) or 2,000,000 tons of pulp per annum. Of this quantity, approximately five-sixths is Douglas fir. The supply is plentiful and will remain so for many years to come.

There are two varieties of Douglas fir, the coast type and the mountain type. The latter variety is of little interest at present from the pulping point of view, for its habitat is not accessible to pulp and paper mills, but the coast variety grows in extensive stands near the established mills of the Northwest. In the present work, the term Douglas fir will refer only to the coast type of the species.

Very little information is available as to the proportion of sapwood in Douglas fir. Hayward *(2)* states that there may be as much as 4 inches of sapwood in a 48-inch diameter log, corresponding to 31 per cent by volume. The specimen used in the present work contained only 15 per cent sapwood by volume in a 27-inch log. The estimated amount of sapwood in slabs from the average sawmill operation is 90 to 95 per cent by volume, corresponding to approximately 98 per cent by weight. Thus it may be seen that any pulping operation based on the utilization of sawmill waste would be concerned principally with the sapwood of the tree.

Although it is a generally accepted fact that cooking Douglas fir with a calcium base sulphite liquor leads to an unsatisfactory pulp with regard to both yield and quality, very few references to laboratory or semicommercial scale work on this point can be found in the literature. Wells and Rue *(3)* state that " . . . (Douglas fir) reduces with difficulty on account of the pitchy character of the wood." They report the following estimates of mill scale operation when pulping this species: "Yield, 45-50 per cent; bleach requirement, 20-25 per cent, with unbleached pulp of fair strength and poor color; probably somewhat pitchy."

English, Green, Mitchell, and Yorston *(4)* have reported on the rate of pulping of alcohol-benzene extracted Douglas fir sawdust, using calcium base liquor, but they consider their data only in its relation to an understanding of the factors which affect sulphite pulping in general. After 7 hours' cooking, without digester relief, at 130 deg. C., and using acid analyzing 5.59 per cent total and 0.80 per cent combined sulphur dioxide, a pulp containing 6.21 per cent lignin and 0.428 per cent sulphur was obtained.

Beuschlein *(5)* compared the pulping rate of alcohol-benzene extracted Douglas fir sawdust with that of white spruce, using soda base liquors. At 150 deg. C. and using a liquor containing 4.00 per cent total and 1.00 per cent combined sulphur dioxide, a Douglas fir pulp containing only 3.8 per cent of noncellulosic matter was obtained. The spruce cellulose yield was approximately 1 per cent higher than that from Douglas fir. Based on these results, it was concluded that it is not the extractives which make the pulping of Douglas fir difficult. The only other alternative is that there exist fundamental differences in the chemical or physical structure of the lignin. Working along similar lines, Bailey *(6)* investigated the lignosulphonic acid obtained from Douglas fir and concluded that lignin from this tree consists of four trimeric coniferyl aldehyde units, whereas spruce lignin is composed of three. This

* Presented at the Fall Meeting of the Technical Association of the Pulp and Paper Industry, Green Bay, Wis., September 8-10, 1938.
A portion of a thesis submitted in partial fulfillment of the requirements of The Institute of Paper Chemistry for the Degree of Doctor of Philosophy from Lawrence College, Appleton, Wis., June, 1938.
[1] Member TAPPI, The Mead Corp., Chillicothe, Ohio.

work was based on the theories of lignin structure advanced by Klason *(7)*.

Benson, Erwin, Hendrickson, and Tershin *(8)* pulped young Douglas fir (3-inch diameter logs), using ammonia base liquors, and obtained satisfactory pulps, similar in properties to pulps from spruce and western hemlock. Old wood gave negative results, but old wood extracted with ammonia pulped satisfactorily. The action of ammonia base sulphite liquor on sprucewood has been found by Dorée and Barton-Wright *(9)* to yield the same lignosulphonic acid as is obtained when calcium bisulphite is used; this indicates that successful pulping with ammonia base liquors is dependent on the reaction between ammonium bisulphite and the extractives of the wood, rather than on differences in behavior of calcium and ammonia base liquors toward the lignin.

With the exception of Benson and his coworkers *(8)*, none of the above-mentioned investigators have specified the source, growth rate, density, or location in the tree from which their wood was obtained. Benson obtained good pulp with no pretreatment of the wood when using young Douglas fir trees up to three inches in diameter. Although no definite information is available on the point, it seems reasonable to assume that trees of this size were composed entirely of sapwood. There are considerable data in the literature pointing out differences in composition, colloidal nature, and pulping properties between sapwood and heartwood. Herty *(10)* obtained sulphite pulp of good quality from young southern pines as long as no heartwood was present.

Schwalbe and Ekenstam *(11)* investigated the colloidal properties of the sapwood and heartwood of pine and spruce in an attempt to explain the differences in behavior on cooking noticed by other investigators. It was found that sapwood approached the properties of heartwood on aging after cutting. Experiments on the adsorption of sulphite liquor by the various kinds of wood showed pine to behave similarly to spruce, but pine heartwood adsorbed the liquor in different concentrations than the other woods. The amount of free sulphurous acid adsorbed by pine heartwood was so small that any cooking operations would have to be considered as a neutral sulphite process. While no similar work on Douglas fir could be found, it is probable that analogous behavior would be observed in the sapwood and heartwood of this species.

Object of Investigation

Since there is an almost unlimited supply of Douglas fir sawmill waste, consisting principally of slabwood which is 85 to 90 per cent sapwood, any pulping operation utilizing this waste would deal almost exclusively with sapwood. The purpose of this investigation was the study of the sulphite pulping of Douglas fir using calcium base liquors and no pretreatment. In the light of the success which has attended the pulping of pine sapwood, it was believed that the pulping of Douglas fir slabwood is possible and commercially feasible. The pulping of heartwood and of sapwood has been carried out separately with the object of evolving cooking conditions within the present commercial limits for the reduction of both slabwood and entire logs.

An investigation of the lignin of Douglas fir sapwood and heartwood was carried out for comparison with similar lignin derivatives prepared from sprucewood. Any differences found in amount or kind of lignin among the several types of wood might explain their differences in behavior on cooking. An investigation of the kind, amount, and distribution of extractives in Douglas fir heartwood and sapwood was also made for the same purpose.

Raw Material

The Douglas fir log used in the present work was obtained from a Pacific Coast sawmill and was cut in the spring of 1937. The log was chosen as representing the average from this region with respect to size and growth conditions. Both ends of the log were painted before shipment to minimize moisture loss and aging in transit. The log was received at The Institute of Paper Chemistry with bark intact.

A density disk, approximately 1 inch in thickness was cut from the log at a distance of 4 feet from one end. This disk was barked, the average diameter calculated from the circumference, and the number of growth rings counted; a separate count of the growth rings in the sapwood was made.

The following method was used in making density measurements: The density disk was weighed, dried to constant weight at 105 deg. C. and cut into pieces of a size convenient for use in the subsequent operations. The dry pieces were dipped in molten paraffin. After cooling, their volume was determined by immersion in water, the volume of the water displaced being measured. In the case of Douglas fir, the density of the sapwood was determined by cutting away all heartwood and making separate volume and weight measurements on the sapwood pieces so obtained. From these data, the moisture content of the wood before chipping and the growth rate and density of both the heartwood and sapwood were calculated; from the relative amounts of sapwood and heartwood in the log, the same values for the entire tree were calculated. Similar measurements were made on the spruce and western hemlock logs used in making comparison pulps. The data obtained are shown in Table I.

TABLE I—DENSITY AND GROWTH RATE OF WOOD

Wood	Average Diameter, Inches	Growth Rings: Total No.	Growth Rings: Per Inch	Specific Gravity	Density, Lb./Cu. Ft.	Per cent of Tree: Vol.	Per cent of Tree: Wt.
Douglas Fir							
Whole tree.....	27.2	259	19.1	0.51	32.2	100	100
Sapwood	2.6	56	38.5	0.76	47	15	20
Heartwood	24.6	209	17.0	0.48	30	85	80
Spruce							
Log 1.....	6.8	132	19.4	0.52	33	...	...
Log 2.....	6.4	66	10.3	0.49	30	...	...
Western Hemlock	21.2	488	23.0	0.47	29	...	...

Wells and Rue *(3)* report the following average fiber lengths for spruce, Douglas fir, and western hemlock: spruce, 2.8 mm., Douglas fir, 4.8 mm., western hemlock, 3.3 mm. A study of the data in Table I shows that Douglas fir sapwood has an unusually high density, due to its extremely slow growth rate. Because of this fact, together with the extra long fiber length, Douglas fir pulps should possess several unusual properties. The high density should be advantageous in increasing yields of pulp per digester, while the long fibers should result in high tearing strengths.

Since average values for the amount of sapwood to be expected in Douglas fir logs could not be found in the literature, data on the diameter and the sapwood thickness for a large number of commercial

Douglas fir logs were obtained from a mill engaged in the manufacture of lumber from this species *(12)*. All of the logs measured were from one stand and were not necessarily representative of the logs found in other localities. Nevertheless, the data indicate the general range of values which might be expected. On logs ranging in diameter from 16 to 40 inches, the thickness of the sapwood layer ranged from 1.25 to 2.25 inches, corresponding roughly to about 15 per cent of the tree. It is the practice in this particular mill to allow 2 inches on the diameter for slabbing cuts, from which the average amount of sapwood to be expected in sawmill slabs has been estimated as over 90 per cent by weight.

Samples of Douglas fir sapwood and heartwood were analyzed for lignin, alcohol-benzene solubility, Cross and Bevan Cellulose, Pentosan content of the wood, acetyl groups and ash, using Institute methods. The analysis of the sprucewood used in this work was obtained from Institute files; a representative analysis of western hemlock wood was obtained from the Forest Products Laboratory at Madison, Wisconsin *(13)*. The data for these analyses are presented in Table II. It should be noticed that, contrary to general opinion, Douglas fir wood is not a resinous wood as judged by alcohol-benzene solubility. Another observation worth noting is the low pentosan content of the fir as compared with that of spruce.

TABLE II—CHEMICAL ANALYSES OF WOOD SAMPLES

Wood	Alcohol-Benzene Solubility, Per cent	Lignin, Per cent	Cross and Bevan Cellulose, Per cent	Pentosans in Cross and Bevan Cellulose, Per cent	Pentosans, Per cent	Acetyl Groups, Per cent	Ash, Per cent
Douglas Fir							
Sapwood ...	2.17	29.4	60.8	5.9	8.54	1.15	0.36
Heartwood .	3.13	28.6	61.5	6.0	8.68	0.48	0.12
Spruce	4.01	29.3	61.9	10.4	13.9	1.59	0.31
Western Hemlock	2.8	30.5	59.3	...	9.6	...	...

Practical Pulping Experiments

The following procedure was used in making the experimental sulphite pulps. A weighed charge of air-dry chips of known moisture content was packed into the digester, which was heated with indirect steam and provided with forced liquor circulation. Cooking acid, previously prepared and adjusted to 6.00 per cent free and 1.25 per cent combined sulphur dioxide, was admitted through the bottom until the liquid level in the digester was 2 inches below the top flange. This was done regardless of the amount of acid required, as experience has shown that a slight variation in the gas volume above the liquor causes more variation in the pulp than a slight variation in the liquor ratio does. The quantity of acid required was measured by means of a calibrated gage glass on the acid tank. The greatest variation observed in the ratio of liquor to wood was 7.1 ± 0.25. After charging the digester, the cover was bolted on and the digester pressure immediately raised to 85 pounds per square inch (gage) by means of the injector and a cylinder of commercial nitrogen gas. The circulating pump was than started, and steam was admitted to the heater at such a rate as to follow the predetermined temperature schedule. Gas was relieved from the digester, as necessary, to keep the pressure constant at the desired value of 85 pounds per square inch.

During the last fifteen minutes before blowing the pressure was relieved at constant rate to 50 pounds per square inch, at which point the digester was blown. The cover was removed and any pulp remaining in the digester and blow line washed into the blow pit with hot water. Before the waste liquor was drained from the pit, a piece of unbleached muslin cloth was securely tied over the drain valve to catch any fibers which might have washed through the false bottom.

After the waste liquor had been drained off, the stock in the pit was flooded with hot water and agitated vigorously for 15 minutes, and the water was drained off. The pit was filled a second time with hot water and stock was stirred for another 10-minute period, after which it was allowed to drain slowly overnight.

All pulps were screened on a small laboratory size Valley flat screen equipped with a plate cut with 0.010-inch slots. The rejections from the screening operation were dried to constant weight at 105 deg. C. The screened pulp was pressed to a density of approximately 25 per cent, broken into small lumps and thoroughly mixed on a large table. It was then stored in an air-tight container; triplicate moisture samples were taken as the can was filled. The wet weight of the pulp in the can was determined and the oven-dry weight calculated from the moisture content. The weight of the screenings was added to that of the screened pulp to determine the total yield. All yield figures are based on the weight of oven-dry wood charged to the digester.

Those experimental pulps which fell within the range of reasonable bleach consumptions were bleached by a two-stage procedure consisting of chlorination, neutralization with caustic soda and a hypochlorite bleach at controlled *p*H. At the end of the bleaching period, the pulp was thoroughly washed with warm water, pressed to a density of approximately 25 per cent, and stored in moisture-tight containers pending physical evaluation.

All of the unbleached and bleached pulps which had any promise of commercial value were evaluated in the Abbé pebble mill, and test sheets were made by TAPPI Method T 205 m. The test sheets were conditioned at 65 per cent relative humidity and 70 deg. F. for at least 8 hours, care being taken to approach the equilibrium condition from the wet side. The sheets were evaluated for burst ratio, tear factor, basis weight, M. I. T. folding endurance, apparent density, and opacity. The last test was applied only to the bleached pulps. All physical tests were made by Institute methods. In addition to the above physical evaluation, permanganate numbers and bleach consumptions were determined on the unbleached pulps. The method of sampling for these two determinations was as follows: Approximately 500 grams of the unbleached pulp, taken in a representative manner from the entire cook, were diluted to about 2 per cent consistency and stirred thoroughly for 20 minutes. The samples actually used in making the determinations were taken in small amounts from this large average sample. It was felt that this method insured values for permanganate numbers and bleach consumptions more nearly representative of the entire lot of pulp than any method of grab sampling.

The best Douglas fir pulps from sapwood, heartwood, slabwood, and the entire tree, together with the two comparison pulps from spruce and western hemlock, were chosen for chemical analysis. The following determinations were made, using Institute methods: lignin, alpha-cellulose, cuprammonium viscosity, pentosans, ether solubility, ash, alcohol-benzene solubility (on the unbleached pulps only), and copper number (on the bleached pulps only). The data obtained are presented later.

The raw material variables which influence sulphite pulping are species, chip length, wood density, and wood moisture content. Of these, only the species variable was changed. The species of wood pulped were spruce, western hemlock, and Douglas fir heartwood and sapwood. Cooks were also made of mixtures of Douglas fir heartwood and sapwood representing slabwood and the entire tree. For the slabwood cook, 15 per cent of heartwood by weight was mixed with the sapwood. This mixture was chosen as being richer in heartwood than would actually be found in sawmill waste. The mixture representing the entire tree was composed of 85 per cent heartwood by weight.

Although the chip moisture content for the different kinds of wood varied, the moisture content of any one kind was constant over a very small range. The small variation which did occur was occasioned by the slight drying of the chips which took place during storage. It is felt, however, that this variation was so small as to be insignificant.

All chips used in this work were cut with the same knife setting on the chipper and were screened and sorted in the same manner. Thus this variable was effectively eliminated.

As has already been stated, acid composition, digester pressure, gas volume in the digesters, and liquor ratio were constant within a very narrow range for all cooks made.

In selecting cooking conditions for the first cooks, an attempt was made to keep the action as mild as possible and still maintain the cooking variables within the commercial range. For this reason a comparatively low maximum temperature of 134 deg. C. was used. The temperature was brought up to this point very slowly after an initial rapid rise to 90 deg. C. The temperature schedule used for the first few cooks is designated as Schedule 1 (*see* Fig. 1) and is given in detail below.

SCHEDULE 1

From Deg. C.	To Deg. C.	Time, Hours	Total Elapsed Time, Hours
20	90	1.0	1.0
90	100	0.5	1.5
100	110	1.0	2.5
110	118	4.0	6.5
118	134	4.0	10.5

Hold at 134 deg. C. until end of cook.

This schedule was of the concave type in order to provide a greater time interval for sulphonation at comparatively low temperatures. Another schedule was used and will be presented later.

The maximum digester pressure in all cooks was 85 pounds per square inch (gage). The pressure was reduced uniformly to 50 pounds per square inch during the last 15 minutes of the cook; all cooks were blown at this final pressure. This maximum pressure falls in the middle of the range of cooking pressures used in present commercial sulphite operations, but the relief period at the end of these cooks was cut short. This short relief period was used in order that cooks might be blown on short notice. In most cases the endpoint of the cook was determined by the color of the cooking liquor; hence, a short relief period made it possible to blow the cooks 15 minutes after the liquor sample indicated that cooking had progressed to the point desired. Any operation involving a longer relief period would require an increase in the total cooking time in order to obtain a pulp with the same degree of delignification.

In most cases cooking time was determined by the color of the cooking liquor. Precipitation of the cooking liquor was observed in several of the cooks, and, as this was followed (within 15 to 30 minutes) by noticeable burning of the pulp, those cooks were blown as soon as possible after precipitation started in order to minimize this effect. The phenomena of burning and precipitation will be discussed in more detail later.

Two sapwood cooks, one of 12.25 hours (D-3) and one of 13.75 hours (D-4), were made using Schedule 1. Both of these cooks produced satisfactory pulps from the standpoint of yield and quality. A heartwood cook (D-5) made under these same conditions with 13.75 hours' total cooking time was found to be raw. Using Schedule 1, two more heartwood cooks were made, the first of 16 hours' duration (D-6). This pulp was badly burned, and the waste liquor contained a considerable amount of an inorganic precipitate, which was found to contain both calcium sulphite and calcium sulphate. Free sulphur may have been present, but it was not identified. Cook D-7 made with heartwood chips under the above conditions and blown after 14.75 hours showed a waste liquor which was somewhat cloudy but had an orange-red color. At a later date, another heartwood cook (D-18) was made under these same conditions and was blown after 14.5 hours. The waste liquor from this cook was clear at the time of blowing, showing that with the cooking conditions used, precipitation occurred some time between 14.5 and 14.75 hours' cooking time.

Several cooks were made at higher maximum temperatures. It was felt that, with a more rapid temperature rise to 145 deg. C., a satisfactory pulp might be obtained before burning occurred. For this reason a sapwood cook (D-9) was made according to Schedule 2 (*see* Fig. 1) given below. This cook resulted in a satisfactory pulp after 10 hours.

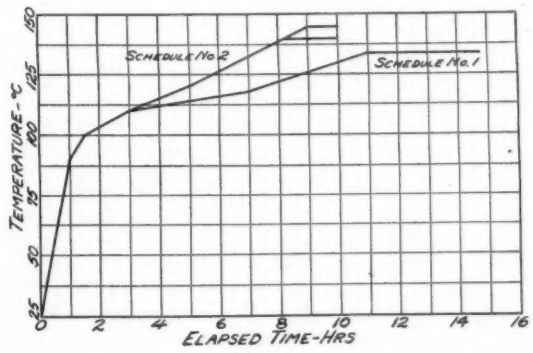


FIG. 1.

Temperature Schedules for Experimental Douglas Fir Cooks.

SCHEDULE 2

From Deg. C.	To Deg. C.	Time, Hours	Total Elapsed Time, Hours
20	90	1.0	1.0
90	100	0.5	1.5
100	110	1.0	2.5
110	120	2.0	4.5
120	145	4.0	8.5

Hold at 145 deg. C. until end of cook.

Cooks made using Schedule 2, but at maximum temperatures below 145 deg. C., had the same rate of rise from 120 deg. C. to the final maximum temperature.

It was found that heartwood could not be pulped at 140 deg. C. without precipitation of the cooking liquor and the attendant burning of the pulp. Cooks made at this temperature were found to be incompletely pulped, although the waste liquor showed the presence of large amounts of precipitate.

Mixtures of sapwood and heartwood chips representing slabwood and the entire tree were pulped. The slabwood mixture (D-19) was pulped in 10 hours using Schedule 2 and a maximum temperature of 140 deg. C. The mixture representative of the entire tree was pulped at a maximum temperature of 134 deg. C. in 14.25 hours, using Schedule 1.

Comparison pulps were made from spruce and western hemlock using cooking conditions similar to schedules actually in use in present commercial operation.

The data obtained in making the experimental cooks are summarized in Table III.

It is apparent from these data that Douglas fir, either as slabs or as whole logs, can be pulped by the sulphite process without any pretreatment or deviation from the range of conditions used in present commercial operation. The data indicate that both the heartwood and sapwood of Douglas fir are more difficult to reduce than either spruce or western hemlock. Heartwood is considerably more difficult to pulp than sapwood. This increased resistance of the wood to pulping, however, is more than offset by the higher density of the wood, giving a higher yield of pulp per digester, and by the increased yield based on the weight of wood used. For example, Cook D-5 gave a screened yield of 56.7 per cent based on the weight of wood, and, even though the bleach consumption was high, the amount of screenings based on the unscreened pulp was only 0.37 per cent. This is an increase of over 8 per cent in weight yield as compared with the spruce cook, S-2, and an increase of 6 per cent over the yield of pulp from western hemlock.

If a commercial digester were to be charged with the same volume of Douglas fir chips as is normally used when cooking spruce, the weight of Douglas fir chips required would amount to approximately 1.33 times the weight of spruce. If it is assumed that the yield of Douglas fir pulp is 2 per cent greater than that obtained from spruce, an amount which could be realized easily in commercial practice, it may be calculated that the weight of pulp obtained from the Douglas fir cook would amount to 1.39 times the weight of spruce pulp. If the spruce were cooked in 10 hours and the Douglas fir in 14 hours, the pulp production per day from Douglas fir would be 2 per cent greater than that from spruce, assuming 1.25 hours for blowing and filling the digester. Thus, in spite of the longer cooking time required for Douglas fir, a change from spruce under the conditions described would result in a 2 per cent increase in pulp production at no extra cost. The cost for the Douglas fir cook would probably be lower than that for the spruce cook, as less steam would be required to cook at the lower temperature employed in pulping Douglas fir. These savings, coupled with the considerably lower cost of wood for the Douglas fir operation, show a decided economic advantage for this species.

It is possible to cook Douglas fir sapwood to almost any desired bleach consumption without danger of precipitation. The low screenings content of those pulps which were burned indicated that this occurred at the end of the cook, after precipitation of the liquor had started. If burning had taken place in the earlier stages, it would have been manifested by a fairly high amount of screenings containing burned chips. This was not the case. In the study of the heartwood of this species, it was found that the major problem was to cook the pulp to the desired degree before precipitation of the liquor occurred. Schedule 1 was used, and precipitation was found to take place somewhere between 14.5 and 14.75 hours. The bleach consumption of Cook D-7, cooked 14.75 hours, was 19 per cent, and that for Cook D-18 after 14.5 hours was 23 per cent. Apparently this is the limit to which heartwood may be pulped under these conditions.

The difficulty in the pulping of Douglas fir heartwood is the precipitation of the cooking liquor and the resultant burning of the pulp. The cause of this phenomenon has not been definitely established, although several factors which influence its occurrence are known. Gishler and Maass *(14)* in their studies on the system calcium oxide-sulphur dioxide-water observed the precipitation of calcium monosulphite from the solutions at temperatures considerably below the normal sulphite cooking range. They found that precipitation temperatures were increased by a decrease in lime content or by an increase in sulphur dioxide concentration of the liquor. In the presence of sprucewood these temperatures were increased considerably, and, although the mechanism by which this increase was obtained was not determined, the suggestion was advanced that the colloidal condition of the wood had a deterrent action on the precipitation.

It may be possible, since calcium monosulphite was observed in the precipitate found in the liquor from

TABLE III.—SUMMARY OF COOKING DATA

Cook No.	Wood	Temperature Schedule No.	Maximum Temperature Deg. C.	Total Time Hours	Liquor Ratio	Yield			$KMnO_4$ No.	Bleach Consistency Per Cent
						Total Per Cent	Screened Per Cent	Screenings Per Cent		
D-3	Sapwood	1	134	12.25	7.33	52.3	51.9	0.78	16.1	21
D-4	Sapwood	1	134	13.75	7.33	46.0	45.9	0.31	11.2	13
D-5	Heartwood	1	134	13.75	6.95	56.9	56.7	0.37	27.2	37
D-7	Heartwood	1	134	14.75	6.94	51.2	51.1	0.18	15.2	19
D-9	Sapwood	2	145	10.00	7.17	50.0	49.7	0.66	12.4	17
D-19	Slabwood	2	140	10.00	7.23	51.9	49.3	4.87	15.5	22
D-20	Whole Tree	1	134	14.25	7.00	49.1	49.0	0.14	11.3	13
S-2	Spruce	*	140	10.00	4.64	48.4	48.0	0.83	11.1	11
WH-1	Western Hemlock	2	140	9.75	6.33	50.5	50.3	0.41	11.4	15

* Temperature and pressure schedules differed from those used in other cooks.

Cook D-6, that the precipitation temperature of the liquor was exceeded in those cooks which exhibited burning. If this is true, then the Douglas fir wood does not elevate the precipitation temperature to the the same extent as does spruce. Also, the heartwood of Douglas fir does not have the same elevating tendency as the sapwood.

Based on the assumption that this property of sulphite acid is the cause of the precipitate, two remedies are suggested. First, the maximum temperature of the cook may be reduced. It was observed that the reduction of the maximum temperature from 140 deg. C. to 134 deg. C. resulted in precipitation much later in the cook. With the same maximum pressure, a reduction in temperature also results in an increase in sulphur dioxide concentration in the liquor, a factor which should be helpful in eliminating the difficulty. There is a limit to this reduction in temperature, however, in that a sufficiency high temperature must be used to complete the cook in a reasonable length of time.

The second remedy involves increasing the concentration of sulphur dioxide in the liquor by increasing the digester pressure. Such a remedy was not tried in the present work, but it is an interesting possibility.

Another factor which may have considerable effect on the tendency of the liquor to precipitate is the relative rate at which calcium oxide and sulphur dioxide are consumed by the wood. If the sulphur dioxide is removed from the liquor by reaction with the lignin of the wood and by digester relief, at a much greater rate than lime is consumed, the precipitation temperature will be lowered. This may well be the case.

It has been demonstrated that small amounts of impurities in the cooking acid affect the promotion of auto-oxidation and reduction of calcium bisulphite to calcium sulphate and free sulphur. Selenium, for example, is very troublesome in this respect; other compounds having similar tendencies are the members of the pinene series. Since the oleo-resin of Douglas fir contains limonene, as well as other members of the pinene series, these constituents may be a contributing factor, if not the only cause, of the precipitation. If this is true, there is no possibility of completely eliminating precipitation by the adjustment of cooking variables alone. Also, a larger amount of these resins would be found in the heartwood than in the sapwood.

Since both calcium sulphite and calcium sulphate were found in the precipitate, it seems reasonable to conclude that precipitation in the case of Douglas fir heartwood is caused by a combination of two reactions: first, the precipitation of calcium sulphite caused by exceeding the precipitation temperature of the liquor; and second, the precipitation of calcium sulphate and free sulphur caused by the presence of compounds of the pinene series. As has been demonstrated by Cooks D-5, D-7, and D-20, this precipitation can be avoided by the careful choice of cooking conditions. By use of conditions reported for these cooks, pulps of a reasonable bleachability may be obtained before the precipitation point is reached.

It is true that most of the Douglas fir cooks made had comparatively high bleachabilities, but this fact is more than offset by the increased yields obtained from this species.

Bleaching Data

A number of the experimental pulps were bleached according to the procedure described earlier. These bleaching data are presented in Table IV. For all the Douglas fir pulps the amount of bleach actually required was less than the amount indicated by the bleach consumption determination. The spruce and western hemlock pulps required more, however, so that the spread between the amounts actually used in bleaching was considerably less than that indicated by the single stage bleach determination. As would be expected, the amounts of caustic soda and lime required vary with the amount of bleach used; those required for the raw pulps were higher. The amounts are not excessive, however, and, in several cases, Douglas fir pulps required less than the spruce and western hemlock pulps. A simple two-stage procedure was used and no difficulty was encountered in bleaching these Douglas fir pulps to brightnesses as high as 80 per cent.

TABLE IV—EXPERIMENTAL BLEACHING DATA

			First Stage		Second Stage			
Cook No.	$KMnO_4$ No.	Bleach Consistency	Cl₂, Per cent	NaOH, Per cent	Bleach, Per cent	CaO, Per cent	Total Bleach	Brightness, Per cent
D-3	16.1	21	1.35	0.36	10	2.2	13.9	79.5
D-4	11.2	13	1.60	0.23	6	1.3	10.6	81.8
D-5	27.2	37	4.54	0.63	20	3.0	33.0	79.5
D-6	8.0	6	0.74	0.18	6	1.3	8.1	79.9
D-7	15.2	19	2.33	0.36	9	1.5	15.7	82.3
D-9	12.4	17	2.08	0.29	9	1.8	14.9	79.3
D-19	15.5	22	2.70	0.40	12	2.9	19.7	79.3
D-20	11.3	13	1.59	0.25	7	1.5	11.5	80.3
S-2	11.1	11	1.35	0.36	10	2.2	13.9	79.5
WH-1	11.4	15	1.84	0.29	10	2.1	15.3	79.8

Physical Properties of Pulps

The physical properties of the unbleached and bleached pulps are given in Table V. These data are compared at a freeness of 600 cc. Schopper-Riegler. Since the primary object of this work was to produce satisfactory pulps from Douglas fir sapwood, heartwood, slabwood, and the entire tree, only those cooks which fulfilled these objectives were completely evaluated. These were Cooks D-3, D-7, D-19, and D-20. The others, though useful in determining the range of variables which produce satisfactory pulps, were not subjected to a chemical analysis.

A study of Table V shows fairly normal behavior with respect to cooking conditions for these pulps. For instance, Cook D-5, a very raw pulp, did not develop as high a burst as those pulps cooked to lower bleach consumptions. This tendency is also observed when cooking sprucewood. Similarly, Cook D-6, which was quite badly burned, showed considerably lower physical properties than the others.

Douglas fir pulps develop their physical properties more slowly than do spruce and western hemlock. This observation holds for both the unbleached and bleached pulps. The burst ratios were found to range from 80 to 113 per cent at 600 cc. freeness, but in no case was a distinct maximum observed in the curve of burst ratio against milling time. Presumably, longer milling would result in increased burst ratios, but at freenesses below 400 cc.

Folding endurance data show these same trends. In general, Douglas fir pulps develop higher folding

TABLE V—PHYSICAL PROPERTIES OF EXPERIMENTAL PULPS

Unbleached Pulps

Cook No.	Wood	Physical Properties at 600 Freeness: Burst Ratio, Per cent	Tear Factor, Per cent	M.I.T. Fold No.	Apparent Density	Time to 600 Freeness, Min.
D-3	Sapwood	112	184	1483	12.7	90
D-4	Sapwood	110	195	1550	14.2	94
D-5	Heartwood	95	135	560	13.4	61
D-7	Heartwood	103	177	1080	13.8	76
D-9	Sapwood	113	201	1330	14.0	92
D-19	Slabwood	109	193	1360	14.1	104
D-20	Whole Tree	100	165	620	13.6	85
S-2	Spruce	142	115	1040	15.1	74
WH-1	Western Hemlock	147	133	2740	15.7	84

Bleached Pulps

Cook No.	Wood	Physical Properties at 600 Freeness: Burst Ratio, Per cent	Tear Factor, Per cent	M.I.T. Fold No.	Apparent Density	Opacity, Per cent	Time to 600 Freeness, Min.
D-3	Sapwood	100	155	900	13.7	44.6	104
D-4	Sapwood	92	190	560	13.3	50.3	106
D-5	Heartwood	96	108	390	13.9	41.5	75
D-7	Heartwood	84	150	340	13.7	45.0	93
D-9	Sapwood	93	218	720	13.1	49.3	110
D-19	Slabwood	98	180	735	13.4	46.6	114
D-20	Whole Tree	86	161	430	13.6	48.4	103
S-2	Spruce	141	122	1900	15.9	55.4	78
WH-1	Western Hemlock	125	136	1275	14.3	45.8	99

strengths than spruce at the higher freenesses, but they do not show as sharp a rise at the lower freeness values.

All Douglas fir pulps exhibited higher tearing strengths than either the spruce or western hemlock pulps. The curves of tear factor against milling time show that the tear factor for Douglas fir pulps decreases much more slowly with increased milling time than either of the comparison pulps. This high initial tear and slow loss on milling are probably due in a large measure to the long fibers of this species.

A low apparent density is a typical property of Douglas fir pulps. The pulps would therefore be useful in producing bulk in a sheet, a property which is very desirable in many grades of paper.

Because of their poor color, unbleached Douglas fir pulps would probably find application only in those grades of paper where color is not important or in heavily dyed shades. Their physical properties indicate their use in such grades as wrapping and cover papers.

When the physical data for the bleached pulps are considered, it is apparent that there was a small amount of degradation during bleaching. Burst and fold of bleached pulps show a decrease over the values for the unbleached pulps, whereas the tear is somewhat higher. In general, the opacity of the Douglas fir pulps is lower than that of spruce, but higher than that of western hemlock.

Bleaching tends to make the rate of hydration of all the pulps somewhat slower but in the same order as was observed for the unbleached pulps.

From a papermaking standpoint, bleached Douglas fir pulps would be desirable blending pulps for almost any grade of paper. When used as the sole component of the furnish, the extremely long fibers of Douglas fir pulps may cause some difficulty on commercial paper machines from the standpoint of formation. The tendency of long fibers to flocculate into knots or bundles, giving rise to wild sheet formation, is known. It may be found necessary to use extreme jordan action in order to decrease the fiber length sufficiently for good sheet formation.

On the other hand, if used as a blending pulp, bleached Douglas fir sulphite would impart desirable properties to many grades of paper. Of primary interest in this respect are the high tear and low apparent density of these pulps. The use of Douglas fir pulps in such grades as mimeo, bond, cover, ledger, printing, folding raw stock, and wrapping would probably result in a cheapened furnish possessing improved physical properties.

Chemical Properties of Pulps

As mentioned previously, chemical analyses were made only on selected pulps. The data obtained are presented in Table VI. Perhaps the two most striking features of the analyses of the unbleached Douglas fir pulps are the high content of alpha-cellulose and the low pentosan content. Values for alpha-cellulose (corrected for lignin) range from 88 to 90 per cent, 6 to 8 per cent higher than those for spruce and western hemlock. Pentosan contents as low as 1.4 per cent were observed, and the maximum found was 3.8 per cent. Both spruce and western hemlock had pentosan contents considerably in excess of these values.

TABLE VI.—CHEMICAL ANALYSES OF EXPERIMENTAL PULPS

Unbleached Pulps

Pulp No.	Wood	Alcohol-Benzene Solubility, Per cent	Ether Solubility, Per cent	Lignin, Per cent	Pentosans, Per cent	Alpha-Cellulose, Per cent	Cuprammonium Viscosity, cp.	Ash, Per cent
D-3	Sapwood	0.73	0.58	0.88	3.63	88.4	57.8	0.48
D-7	Heartwood	0.84	0.62	0.75	3.14	88.6	64.1	0.56
D-19	Slabwood	0.78	0.64	0.98	3.80	89.9	69.8	0.53
D-20	Whole Tree	0.81	0.58	0.58	1.34	90.0	58.3	0.41
S-2	Spruce	1.24	0.86	0.41	6.17	82.5	57.6	0.47
WH-1	Western Hemlock	0.95	0.80	0.64	4.75	84.1	61.7	0.43

Bleached Pulps

Pulp No.	Wood	Ether Solubility, Per cent	Lignin, Per cent	Pentosans, Per cent	Alpha-Cellulose, Per cent	Cuprammonium Viscosity, cp.	Copper No.	Ash, Per cent
D-3	Sapwood	0.53	0.04	3.50	86.4	38.6	1.61	0.46
D-7	Heartwood	0.59	0.05	2.97	87.2	36.9	1.23	0.40
D-19	Slabwood	0.60	0.06	3.61	86.6	40.7	0.80	0.51
D-20	Whole Tree	0.55	0.03	1.28	87.4	34.7	1.41	0.48
S-2	Spruce	0.83	0.04	5.88	82.4	24.7	1.13	0.43
WH-1	Western Hemlock	0.75	0.05	4.63	82.8	28.8	1.29	0.47

Although many investigators have described Douglas fir as a resinous wood, actual analysis of the wood shows this idea to be erroneous. The alcohol-benzene solubility of both the heartwood and sapwood of this species is lower than that found for spruce or western hemlock, and this fact is also observed in the analysis of the unbleached pulps. The ether solubility of unbleached Douglas fir pulps is also lower than that of spruce or western hemlock, indi-

cating that unbleached Douglas fir pulps would cause little or no pitch trouble on the paper machines.

The lignin content of these pulps is about that expected from the bleach consumptions, although the correlation between bleachability and lignin content is only a general one.

The chemical analyses indicate that the bleached Douglas fir pulps, though showing slight degradation from the bleaching operation, possess all the properties of spruce pulps after a mild alpha treatment. The viscosity is considerably higher than that for the spruce and western hemlock pulps, and the increase in alpha-cellulose content over the other two species is again apparent. The pentosan content is somewhat lower than for the unbleached pulps, but not significantly so. The differences between the pentosan contents of the species are in the same order as was found for the unbleached pulps. The ether solubility of the bleached Douglas fir pulps is lower than that of spruce and western hemlock, but there are no significant differences between the lignin and ash values. Copper numbers are somewhat high for bleached pulps, indicating that some slight degree of degradation occurred during the bleaching operation. Nevertheless, the analytical data are comparative, as the same procedure was used for all pulps.

Because of their high alpha-cellulose content, the use of the bleached Douglas fir pulps for the manufacture of cellulose derivatives is suggested. No data are available on this point, but the chemical analyses of the pulps indicate that any purification treatment need not be as extensive as with other pulps. This particular application of Douglas fir pulps is certainly worth further investigation.

General Summary

Pulps satisfactory with respect to yield and quality were obtained from Douglas fir heartwood, sapwood, slabwood, and the entire tree by the usual sulphite process. It was not found necessary to use any chemical pretreatment or special base in the cooking liquor to accomplish this, contrary to the findings of other investigators as reported in the literature.

The principal points of difference between the cooking conditions used by these workers and those used in this investigation are: first, a higher concentration of free sulphur dioxide was used in these cooks, and second, all experimental pulping in this work was carried out at temperatures ranging from 134 to 140 deg. C., values considerably lower than those reported in the literature. As some difficulty was encountered in pulping the heartwood of this species at 140 deg. C. (because of the precipitation of the cooking liquor and the resultant burning of the pulp), these variations in cooking conditions may well account for the success of this work and the poor results obtained by others.

The cooking conditions used in pulping Douglas fir were such as to give a high concentration of sulphur dioxide in the liquor until well into the cook. This was accomplished by using a very slow temperature rise from 110 deg. C. up to maximum temperature and a high initial pressure (85 pounds per square inch), thus favoring complete and rapid penetration of the chips and allowing a fairly long period at comparatively low temperatures for sulphonation of the lignin. The success of these measures may be judged by the very low screenings obtained. While cooking under these conditions requires a longer total cooking time, the higher wood density of Douglas fir and the somewhat higher pulp yields more than compensate for this extra cooking period, thus making it possible to obtain a slightly increased yield of pulp per day when using this species.

The larger quantity of ether-soluble resin in Douglas fir heartwood does provide evidence that precipitation of the cooking liquor encountered when pulping this wood may be caused by the action of compounds of the pinene series in promoting auto-oxidation and reduction of the liquor to calcium sulphate and free sulphur. As has been discussed in some detail previously, it is entirely possible that Douglas fir heartwood does not elevate the precipitation temperature of sulphite liquor to the same extent as does spruce, thus providing another explanation for this phenomenon. However, using the proper cooking conditions, precipitation in the liquor may be avoided.

The bleached and unbleached Douglas fir pulps upon beating gave development curves for physical properties which were similar to normal bleached sulphite pulps. While these development curves might be considered in the normal range of sulphite pulps, they did show a distinctly slower rate of development than the spruce and western hemlock pulps prepared in this study. In comparison with the spruce and western hemlock pulps, the Douglas fir pulps, in general, were low in bursting and folding strengths and very much higher in tearing strengths. Another outstanding difference is noted in the low apparent density; i.e., high bulk of the Douglas fir pulp.

Because of the much longer fiber length of the Douglas fir pulps, it may be that difficulties in obtaining uniform formation would be encountered when these pulps were used as the complete fiber furnish for grades requiring good formation. However, it seems probable that Douglas fir pulp would impart valuable characteristics to sheets that are normally made of spruce or hemlock pulp if it were blended with the spruce or hemlock in the correct proportions. Higher bulk and tear than can be made from normal sulphite are often desired in many cases. Douglas fir pulp should improve these properties, even when added in moderate amounts.

Unbleached pulps from Douglas fir were found to have considerably higher alpha-cellulose and lower pentosan contents than pulps from spruce or western hemlock. The low ether solubilities of the Douglas fir pulps indicate that very little or no pitch trouble would be occasioned by their use on the paper machine.

It was found that Douglas fir pulps from the sapwood, as well as those prepared from mixtures of the two, could be bleached to a relatively high brightness by a two-stage bleaching operation. While the method of bleaching employed caused some degradation of the pulp, the results are truly comparative, for both spruce and western hemlock pulps were also bleached by this method.

The bleached pulps had physical properties similar in all respects to those of the unbleached pulps. Their application to papermaking has already been discussed.

The chemical analyses of the bleached Douglas fir pulps show decidedly higher alpha-cellulose and lower pentosan contents than were observed for spruce and western hemlock. This suggests their applica-

tion in the manufacture of cellulose derivatives, and, while no data were taken in this respect, an investigation in this direction should prove worth while.

Literature Cited

(1) Greeley, W. B., *Pac. Pulp Paper Ind.* 2, no. 12:28-29 (Nov., 1928).
(2) Hayward, P. A., "Wood, Lumber and Timbers." New York, Chandler Cyclopedia, 1930. p. 360-368.
(3) Wells, S. D., and Rue, J. D., "The Suitability of American Woods for Paper Pulp." U. S. Dept. Agriculture, *Bull.* No. 1485. Washington, U. S. Govt. Print. Off. 1927.
(4) English, H., Green, H., Mitchell, C. R., and Yorston, F. H., *Forest Products Labs. Canada, Pulp Paper Lab., Quarterly Rev.* No. 20:15-21 (Oct.-Dec., 1934).
(5) Beuschlein, W. L., *Paper Trade J.* 88, no. 19:66-67 (May 9, 1929).
(6) Bailey, A. J., *Paper Ind.* 16:480-483 (1934).
(7) Klason, P., *Ber.* 64:2733-2739 (1931).
(8) Benson, H. K., Erwin, R. P., Hendrickson, J. R., and Tershin, J. A., *Paper Trade J.* 99, no. 12:87-89 (Sept. 20, 1934).
(9) Dorée, C., and Barton-Wright, E. C., *J. Soc. Chem. Ind.* 48:9-11T (1929).
(10) Herty, C. H., *Paper Trade J.* 96, no. 13:23-27 (March 30, 1933).
(11) Schwalbe, C. G., and af Ekenstam, A., *Cellulosechem.* 10:1-11 (1929).
(12) Private Correspondence, J. H. Souliere of the Anacortes Lumber and Box Co. (1938).
(13) Private Correspondence, Tabulation of data sent to H. F. Lewis by C. E. Curran (1937).
(14) Gisler, P., and Maass, O., *Can. J. Research* 13B:270-279 (1935).

Volume V of Manufacture of Pulp and Paper

The third edition of Volume V of the series of textbooks upon the manufacture of pulp and paper sponsored by the North American paper industry and published by the McGraw Hill Book Company, is now available to a large waiting list of readers and users throughout the world.

The preparation and publication of this series of books during the past 20 years under the capable editorship of J. N. Stephenson has been a noteworthy cooperative undertaking. The original publication of the five volumes in the series, which constituted an undertaking unique in the paper industry, and one which has been seldom equalled in other industries, took place during 1921, 1922, 1924 and 1925. Volumes I and II, intended for the preliminary training of students who had not had opportunity to attend school sufficiently to understand the technicalities of pulp and paper manufacture, dealt with questions in mathematics, physics, hydraulics, electricity and chemistry. These volumes have not needed revision and have been in steady use since publication. There has been a different story, however, with Volumes III, IV and V which cover the manufacture of all kinds of pulp and paper. Here there has to be constant revision to keep step with the development of new processes and equipment in a worldwide industry using a great variety and wealth of raw materials. Therefore, it was necessary to bring out second and revised editions of Volumes III, IV and V during 1927, 1928 and 1929, to be followed by the present third editions of Volume III in 1937, Volume IV in 1938 and Volume V at this time. In the preface to the latest edition of Volume V the editor notes especially that the section on papermaking machines embodies descriptions of new headbox designs, a new method of installing the wire, a new press part, a new electric drive, an additional chapter on insulating boards, and new designs of cylinder machines. Extensive changes have been made in the text on handmade papers (now a section by itself) and in papermaking details. The sections on coated papers and paper testing have been rewritten.

The section on papermaking machines, originally written by J. W. Brassington, is revised for fourdrinier machines by George D. Bearce and for cylinder machines by Arno W. Nickerson. The 400 or more pages in this section cover in simple technical detail, with numerous drawings and illustrations, every part of the paper machine from stock chest to calender, winder and slitter. There is also a full discussion of the many questions of operation having to do with water and steam supply, care of machine clothing, machine room ventilation, the basic principles of paper machine drives and paper production calculations.

The section on handmade papers is by the best known world writer on the subject, Dard Hunter; the section upon paper finishing, originally written by W. D. Sommerville, is revised by Vincent Waters; the section upon coated papers is written by Norman Clark and Edwin Sutermeister with valuable assistance from other practical operating men in the industry; the section upon gummed papers is by Gardner R. Alden and that upon paper testing by B. W. Scribner and F. T. Carson. The final section in the book under the title "Papermaking Details" was prepared by the editor with the assistance of numerous associates in the industry and consists chiefly of definitions of the principal types of paper, including the materials used, their preparation and the uses of the product.

There is also a detailed index of the volume covering some 17 pages, by means of which any important item can be quickly located.

Volume V upon the manufacture of pulp and paper is uniform with its predecessors and carries the same high standards of readability and mechanical production. It contains approximately 775 pages and is delivered postpaid for $6.50 per copy. Orders may be placed at this price through the Technical Association of the Pulp and Paper Industry.

R. S. KELLOGG.

Economics of Chemical Industries

A new book, The Economics of Chemical Industries, by Edward H. Hempel, Ph. D., D. C. S., just published by John Wiley & Sons, Inc., New York, is a text book of particular value to the student. The price is $3 a copy. The scope of the book covers the history, economic value and progress of the chemical industries, the sale of chemicals, establishment of prices, financial policies and the foreign chemical trade.

As the purpose of the book is primarily to provide an adequate background to the economics of the American chemical industries, only the basic rules and methods are included, thus simplifying the text by the exclusion of technical details. The text, therefore, supplies an excellent preliminary course of instruction for those readers who wish to be well informed on the subject but who do not require or desire a more complete technical presentment, such as would be required in the usual engineering texts.

Review Of Paper Industry Literature

Copies of United States Patents can be obtained from the United States Patent Office, Washington, D. C. for 10 cents each. Send currency, not stamps.

Specialties

Paper and Process for the Manufacture of Same. Webster E. Byron Baker. U. S. pat. 2,106,709 (Feb. 1, 1938).—To give a good finish to relatively thin lightweight paper, there is applied to the surface an aqueous 5% starch suspension containing also a finely divided water-insoluble pigment such as titanium dioxide, lithopone, etc., in an amount not exceeding that of the starch present. The treated paper is then dried and calendered. (Cl. 91-68).—A.P.-C.

Material Impermeable to Ultraviolet Rays. Otto Gerngross and Alexander Callo. U. S. pat. 2,106,599 (Jan. 25, 1938).—Material such as translucent paper is rendered impermeable to ultraviolet rays by incorporating therein an aqueous pine bark extract, washing to remove coloring and tanning constituents, and drying. (Cl. 91-68).—A.P.-C.

Process of Impregnating Fibrous Materials. Izador J. Novak, assignor to Raybestos-Manhattan Inc. U. S. pat. 2,107,304 (Feb. 8, 1938).—A wet fibrous web is treated with rubber latex to incompletely saturate it and leave an excess of latex adjacent the surface. The web is wound upon itself under sufficient pressure to drive the excess rubber latex into the plies and to cause interfelting of the plies so as to obtain a product having the rubber substantially uniformly distributed throughout the entire thickness of the sheet, and the fibers of adjacent plies interfelted. (Cl. 92-40).—A.P.-C.

Composite Sheet Article. John B. Catlin, assignor of Paper Patents Co. U. S. pat. 2,111,205 (March 15, 1938).—An article which must be relatively stiff in the interior portions and has a marginal flange of relatively flexible and resilient material is produced by forming a composite sheet having a layer of stiff material (e.g., fiber board) and a closely adherent layer of different material which is relatively flexible and resilient and which extends beyond the stiff material (e.g., artificial leather). (Cl. 36-68).—A.P.-C.

Manufacture of Flexible Abrasive Articles. Robert C. Bryant, assignor to The Carborundum Co. U. S. pat. 2,108,645 (Feb. 15, 1938).—Intermittently coated abrasive is produced by applying a thin coating of liquid adhesive to one face of a fabric, then after a short interval pressing out the adhesive from certain areas in a pattern which is indefinitely repeated on the surface of the fabric (suitably by means of engraved press rolls), dropping finely divided abrasive on the unevenly coated adhesive surface, and removing abrasive particles from the less adhesive portions of the surface thus treated. (Cl. 91-68).—A.P.-C.

Method of Making Paper. William C. Nash. U. S. pat. 2,108,231 (Feb. 15, 1938).—A reinforcing layer or liner of rag or other like fibers is applied to a kapok insulating material prepared in accordance with U. S. pat. 1,973,722. (Cl. 92-29).—A.P.-C.

Paper Utensil Suitable for Use in Baking Pies. Herbert J. Krause and Paul R. Simmons, assignors to Simmons Paper Products, Inc. U. S. pat. 2,098,784 (Nov. 9, 1937).—A plate of absorptive paper stock has its inner surface only provided with a glass-like continuous coating of the dried residue of a solution of an alkali metal silicate and citric or tartaric acid. (Cl. 53-6).—A.P.-C.

Artificial Sausage Casing. Gustav Sachsenröder. U. S. pat. 2,101,958 (Dec. 14, 1937).—Casings are formed of hydrated fibrous paper, hydrated to such a degree that its lateral extensibility at the periphery of the casing in the wet state exceeds 25%, and having a skin-like translucent consistency. (Cl. 99-176).—A.P.-C.

Process of Treating Paper. Chester D. Rockwood and Kenneth L. Osmun, assignors to The Union Selling Co. U. S. pat. 2,107,343 (Feb. 18, 1938).—Cotton paper is passed through a solution of "commercial grade" zinc chloride dissolved in commercial 40 per cent formaldehyde solution. (Cl. 8-20).—A.P.-C.

Corrugated Paperboard Making Machine. George W. Swift, Jr., assignor to George W. Swift, Jr., Inc. U. S. pat. 2,107,430 (Feb. 8, 1938).—Regularity of feed of the corrugated sheet is obtained by maintaining, while the corrugated paper web is passing through the double-backer, substantially constant (but moderate) longitudinal tension on the series of endless friction conveyor members which engage and frictionally advance the corrugated paper web through the machine. An apparatus embodying this principle is described. (Cl. 154-30).—A.P.-C.

Forming of Paperboards. Ewen R. Smith, assignor to Papercrete Ltd. U. S. pat. 2,107,587 (Feb. 8, 1938).—The apparatus comprises two platens that are movable relatively to each other and enclosing a space to which stock is admitted. One of the platens carries a sieve onto which a layer of pulp is deposited by suction. The other platen carries a flexible surface adapted to be pressed into contact with the sieve to couch the layer of pulp. (Cl. 92-61).—A.P.-C.

Fire Resistant Pulp Board. Hubert L. Becher, assignor to Monasote Co. U. S. pat. 2,108,761 (Feb. 15, 1938).—Aluminum hydrate is deposited on the fibers, preferably in the beater by adding aluminum sulphate and then sodium hydroxide. A suitable furnish comprises 26% of pulp, 6% of aluminum hydrate, 7% asbestos fiber, 26% fuller's earth and 35% of exfoliated vermiculite. (Cl. 92-21).—A.P.-C.

Shingle. Norman P. Harshberger and Kathleen M. Harshberger, assignors to Bakelite Building Products Co. Inc. U. S. pat. 2,103,076 (Dec. 21, 1937).—The longitudinal edges extend in a plane slightly elevated from that of the body portion, this being brought about by depressing the shingle centrally. (Cl. 108-7).—A.P.-C.

Floor Covering. Louis L. Larson and George L. Schwartz, assignor to Krafelt Corp. of America. U. S. pat. 2,105,484 (Jan. 18, 1938).—An absorbent felt is partially saturated by applying to the face only of the sheet a saturant such as a pigmented varnish composition containing not more than about 35% by volume of solvent. While the saturant is still liquid

and without intermediate curing, the sheet is printed with print paint which penetrates substantially through the sheet, and the latter is then cured at high temperature. Various details of apparatus and operation are described. (Cl. 91-68).—A.P.-C.

Method of Manufacturing Roofing Elements. William A. Harris, assignor to The Texas Co. U. S. pat. 2,104,384 (Jan. 4, 1938).—A number of separate coatings of asphalt are applied to a prepared base material and granular material is applied to the surface of each separate coating of asphalt. In order to obtain a positive bond between the successive coatings of asphalt, each coated surface is furrowed before superimposing another coating of asphalt, and then sufficient pressure is applied to the exposed surface to force asphalt into the furrows to contact and adhere to all of the exposed surfaces in the underlying coating caused by the furrowing, and to flatten them slightly, thereby producing keys. (Cl. 91-68). —A.P.-C.

Bituminized Web Materials. Harold W. Greider and George Arthur Fasold, assignors to The Philip Carey Manufacturing Co. U. S. pat. 2,105,531 (Jan. 18, 1938).—A web of material such as felt impregnated with a saturant such as soft asphalt is immersed in a bath of melted coating material such as asphalt of higher melting-point. Air is expelled from the felt by means of pressure applied by progressively squeezing the web while submerged in the melted coating material. The pressure on the web is released while it is still submerged in the coating material, and an inflow and outflow of melted coating material to and from the bath are maintained so that the foam of air bubbles released from the web is withdrawn from the bath without coming into contact to any substantial extent with the web after release of the pressure on the latter. (Cl. 91-70).—A.P.-C.

Roofing and Siding Material. Norman P. Harshberger, assignor to Bakelite Building Products Co. U. S. pats. 2,095,248 and 2,095,249 (Oct. 12, 1937). —*No. 2,095,248*—A rigid roofing or siding element comprises a fibrous web to which is applied a waterproof adhesive. A precoating of loosely matted filamentous substance is secured in the adhesive, and over it is applied a hardened and rigidifying coating comprising hydraulic cement. *No. 2,095,249*—In a roofing and siding element comprising a base of pliable material, the base has a portion forming a fold. Granular material is secured to the outer side of the fold around the bend, and a hardened and rigidifying hydraulic cement coating is applied over the granular material. (Cl. 91-68).—A.P.-C.

Insulating Material. Frank R. Leslie. U. S. pat. 2,108,682 (Feb. 15, 1938).—An insulating element such as a pad or bat of vapor permeable insulating material having either mineral or organic fibrous structure is treated with a viscous rubber or similar solution in a volatile solvent, the viscosity of the solution being sufficiently high to prevent penetration of the solution beyond the outer surface portion of the element. The solvent is then evaporated. (Cl 154-44).—A.P.-C.

Discuss Calcium Carbonate at Kalamazoo

The Kalamazoo Valley Section of the Technical Association of the Pulp and Paper Industry met at the Park-American Hotel, Kalamazoo, Mich., Thursday, February 2nd. Paul de Guehery of the Michigan Paper Company presided as Chairman.

The principal speaker was Howard F. Roderick, Director of Research of the Michigan Alkali Company, Wyandotte, Mich. who talked on "Recent Developments in the Production of Calcium Carbonate for Paper Coating". Mr. Roderick pointed out that there are, in general, two types of calcium carbonate: (a) the natural, with variable properties and composition, and (b) the precipitated, with controlled properties and composition. He showed curves illustrating the properties of the paper coating containing various percentages of precipitated calcium carbonate and clay. The tendencies were, with the addition of calcium carbonate, to have increased brightness, opacity (after calendering), smoothness and ink absorption, and to decrease the wax test, glass and viscosity.

Following Mr. Roderick's paper, W. A. Kirkpatrick II led a discussion in which a number of those present participated. It was felt that the use of some calcium carbonate in the mix is desirable. There were fifty-five present, including the following: C. Abbott, Kalamazoo, Mich., W. A. Kirkpatrick, 2nd, Kalamazoo, Mich., F. R. Hamilton, Kalamazoo, Mich., J. C. Widmeyer, Kalamazoo, Mich., M. Dohse, Wabash, Ind., Lee Dwyer, Wabash, Ind., C. H. Billington, Wabash, Ind., R. W. Long, Wabash, Ind.; O. W. Callighan, Metuchen, N. J., J. L. Russell, Kalamazoo, Mich., W. Kidder, Kalamazoo, Mich., R. A. Olson, Kalamazoo, Mich., Wm. Randall, Kalamazoo, Mich., C. F. Somerville, Jr., Kalamazoo, Mich., J. S. Gallagher, Kalamazoo, Mich., M. R. Wilkins, Kalamazoo, Mich., J. P. Strasser, Chicago, Ill., D. W. McCready, Ann Arbor, Mich., R. L. Barton, Kalamazoo, Mich., G. F. Ingling, Kalamazoo, Mich., C. C. Schneider, Chicago, Ill., N. J. Cowie, Chicago, Ill., W. F. Costello, P. F. Neumann, Wilmington, Del., F. L. Chappel, Wilmington, Del., H. O. Ware, Wilmington, Del., B. K. Asdell, Wilmington, Del., H. F. Kleinman, Wilmington, Del., A. G. Dreis, Wilmington, Del., M. J. Loveland, Wilmington, Del., R. T. Mashburn, Wilmington, Del., W. J. Higbie, Wilmington, Del., Paul Easton, Wilmington, Del., Hugh Smith, Kalamazoo, Mich., Frank Libby, Kalamazoo, Mich., Al Perlick, Kalamazoo, Mich., W. F. Hathaway, Kalamazoo, Mich., A. L. Sherwood, Kalamazoo, Mich,. E. F. Whittington, Kalamazoo, Mich., Hienie Nendorf, Kalamazoo, Mich., A. N. Cole, Kalamazoo, Mich., H. Bucklin, Kalamazoo, Mich., Hod Heath, Kalamazoo, Mich., H. C. Bradford, Kalamazoo, Mich., A. E. Hays, Plainwell, Mich., R. C. VonMaur, Plainwell, Mich., Paul de Guehery, Plainwell, Mich., M. S. Fogerty, Plainwell, Mich., G. C. Schmid, Plainwell, Mich., H. F. Roderick, Wyandotte, Mich., P. R. Welch, Wyandotte, Mich., R. O. Carter, Chicago, Ill., F. L. Brown, S. V. Cottrell, H. E. Stafford, Kalamazoo, Mich.

Imports of Paper and Paper Stock

Giving Manifests of New York, Boston, Philadelphia and Other Ports of Newsprint, Wrapping, Writing, Coated, Blotting, Tissue, Strawboard, Wallboard, Cigarette Papers, Sulphite, Kraft and Ground Wood Pulp.

NEW YORK IMPORTS

WEEK ENDING FEBRUARY 11, 1939

SUMMARY

Cigarette paper.....807 cs.
Paper hangings.....4 bls., 1 cs.
Wall board.....3260 bdls.
Newsprint.....1808 rolls, 70 bls.
Printing paper.....17 rolls
Wrapping paper.....2 cs., 286 bls., 5188 rolls
Drawing paper.....2 cs.
Filter compound.....100 bls.
Filter paper.....17 cs.
Tracing cloth.....10 cs.
Photo paper.....8 cs.
Transfer paper.....23 cs.
Tissue paper.....33 cs.
Paraffine paper.....2 cs.
Gummed paper.....1 cs.
Paper boards.....13 cs.
Miscellaneous paper.....4 bdls., 9 cs.

CIGARETTE PAPER

Champagne Paper Corp., *Paris,* Havre, 455 cs.
De Mauduit Paper Corp., *Paris,* Havre, 2 cs.
Champagne Paper Corp., *Washington,* Havre, 200 cs.
Jay Madden Corp., *Hammaren,* Helsingfors, 125 cs.
H. H. Straus, *Pipestone County,* Bordeaux, 25 cs.

PAPER HANGINGS

W. H. S. Lloyd & Co., *American Merchant,* London, 4 bls., 1 cs.

WALL BOARD

Treetex Corp., *Wanja,* Horneborg, 2,545 bdls.
Treetex Corp., *Hammaren,* Gothenburg, 715 bdls.

NEWSPRINT

National Pulp & Paper Co., Inc., *Pr. Harding,* Hamburg, 204 rolls.
Jay Madden Corp., *Pr. Harding,* Finland, 296 rolls.
Jay Madden Corp., *Mormacport,* Helsingfors, 263 rolls.
Jay Madden Corp., *Mormacport,* Kotka, 54 rolls.
Jay Madden Corp., *Scanpenn,* Hango, 199 rolls.
Jay Madden Corp., *Scanpenn,* Rauma, 266 rolls.
Walker Goulard Plehn Co., Inc., *Hammaren,* Helsingfors, 70 bls.
Lunham & Reeve, Inc., *Hammaren,* Helsingfors, 364 rolls.
Jay Madden Corp., *Hammaren,* Helsingfors, 162 rolls.

PRINTING PAPER

Dingelstedt & Co., *Ilsenstein,* Antwerp, 17 rolls.

WRAPPING PAPER

Jay Madden Corp., *Pr. Harding,* Finland, 243 bls., 2,184 rolls.
E. W. Twitchell, Inc., *Pr. Harding,* Finland, 20 rolls.
American Paper Products, *Pr. Harding,* Finland, 169 rolls.
Schwartz & Co., Inc., *Black Gull,* Antwerp, 2 cs.
Jay Madden Corp., *Washington,* Finland, 2,475 rolls.
Heemsoth Kerner Corp., *Washington,* Hamburg, 10 bls.
———, *Hammaren,* Gothenburg, 33 bls., 340 rolls.

DRAWING PAPER

Danish National Commission, *Scanpenn,* Copenhagen, 2 cs.

FILTER COMPOUND

Mager Bros., Inc., *Pr. Harding,* Hamburg, 100 bls.

FILTER PAPER

H. Reeve Angel & Co., Inc., *American Merchant,* London, 17 cs.

TRACING CLOTH

Keuffel & Esser Co., *American Importer,* Liverpool, 10 cs.

PHOTO PAPER

J. J. Gavin Co., *Queen Mary,* Southampton, 8 cs., (unsensitized).

TRANSFER PAPER

Dingelstedt & Co., *Washington,* Hamburg, 23 cs.

TISSUE PAPER

W. J. Byrnes & Co., *Aquitania,* Southampton, 5 cs., (coated).
———, *Aquitania,* Southampton, 2 cs., (coated).
B. F. Drakenfeld & Co., *Carinthia,* Liverpool, 5 cs.
Van Oppen & Co., *Excambion,* Genoa, 17 cs.
Ecuadorian Panama Hat Co., *Excambion,* Genoa, 2 cs., (caps).
W. J. Byrnes & Co., *Queen Mary,* Southampton, 2 cs., (coated).

PARAFFINE PAPER

Chas. Happel, Inc., *Washington,* Hamburg, 2 cs.

GUMMED PAPER

Gold Seal Importers, *Washington,* Hamburg, 1 cs.

PAPER BOARDS

———, *Jean Jadot,* Antwerp, 13 cs.

MISCELLANEOUS PAPER

Yardley & Co., *American Merchant,* London, 7 cs.
F. J. Emmerich, *Paris,* Havre, 4 bdls.
E. H. Sargent & Co., *Hammaren,* Gothenburg, 2 cs.

RAGS, BAGGINGS, ETC.

———, *Carinthia,* Liverpool, 82 bls. rags.
Richard Shipping Co., *Black Gull,* Antwerp, 14 bls. rags.
E. C. Andrews, *Volendam,* Rotterdam, 101 bls. picker waste.
R. Blank, *Exchester,* Sfax, 124 bls. rags.
W. Steck & Co., *Nordkap,* Buenos Ayres, 140 bls. rags.
Darmstadt Scott & Courtney, *Nordkap,* Buenos Ayres, 126 bls. rags.
Royal Manfg. Co., *Jean Jadot,* Antwerp, 95 bls. cotton waste.
———, *American Importer,* Liverpool, 50 bls. twine waste.
Chase National Bank, *Ilsenstein,* Antwerp, 114 bls. bagging.
Castle & Overton, Inc., *Pipestone County,* Havre, 30 bls. rags.
Brandwein Mazur Co., *Pipestone County,* Havre, 57 bls. rags.
W. J. Green, *Pipestone County,* Havre, 30 bls. rags.
Chase National Bank, *Pipestone County,* Bordeaux, 233 bls. rags.
E. J. Keller Co., Inc., *Pipestone County,* ———, 51 bls. rags.
E. J. Keller Co., Inc., *Lundby,* ———, 590 bls. paper stock, 189 bls. bagging.

OLD ROPE

W. Steck & Co., *Volendam,* Rotterdam, 64 coils.
———, *Kyno,* Hull, 43 coils.

WOOD PULP

Stora Kopparberg Corp., *Wanja,* Skutskar, 265 bls. dry pulp, 53 tons.
———, *Wanja,* Wallvik, 750 bls. sulphite.
Castle & Overton, Inc., *Washington,* Hamburg, 173 bls. wood pulp, 25 tons.
Pulp Sales Corp., *Mormacport,* Kotka, 992 bls. mechanically ground pulp; 178 bls. sulphate, 35 tons; 3,810 bls. sulphite, 717 tons.
Pulp Sales Corp., *Scanpenn,* Rauma, 3633 bls. sulphite, 615 tons.
Perkins Goodwin & Co., *Hammaren,* Gothenburg, 140 bls. sulphate.
Castle & Overton, Inc., *Hammaren,* Helsingfors, 1,400 bls. unbleached sulphite.
Pulp Sales Corp., *Hammaren,* Helsingfors, 508 bls. sulphite; 2,480 bls. sulphate.

WOOD PULP BOARDS

Darcy Export Co., *Pr. Harding,* Hamburg, 23 bls.

Jay Madden Corp., *Mormacport,* Kotka, 98 rolls.
Jay Madden Corp., *Scanpenn,* Hango, 42 bls.
H. Fuchs & Son, *Hammaren,* Gothenburg, 82 crates.
Salwen Paper Co., *Hammaren,* Gothenburg, 12 bls.
Fibre Case & Novelty Co., *Hammaren,* Gothenburg, 52 bls.

PORTLAND IMPORTS

WEEK ENDING FEBRUARY 11, 1939

Pagel Horton & Co., Inc., *Korsholm,* Sweden, 2,970 bls. wood pulp.
Gottesman & Co., Inc., *Korsholm,* Sweden, 3,000 bls. wood pulp.
Gottesman & Co., Inc., *Gonzenheim,* Sweden, 3,375 bls. wood pulp.

BOSTON IMPORTS

WEEK ENDING FEBRUARY 11, 1939

Gottesman & Co., Inc., *Gonzenheim,* Sweden, 150 bls. wood pulp.
G. F. Malcolm, Inc., *Carinthia,* Liverpool, 11 cs. tissue paper.
———, *Carinthia,* Liverpool, 75 bls. rags.
American Express Co., *Carinthia,* Liverpool, 6 bls. rags.
Commercial Bank of Greece, *Exchester,* Piraeus, 60 bls. old garments.

PHILADELPHIA IMPORTS

WEEK ENDING FEBRUARY 11, 1939

———, *Sarcoxie,* Dundee, 77 bls. paper stock.
———, *Sarcoxie,* Hamburg, 282 rolls, 13 bls. wrapping paper.
Commercial Bank of Greece, *Exchester,* Piraeus, 400 bls. rags.
Chase National Bank, *Exchester,* Sfax, 470 bls. rags.
J. W. Hampton, Jr., & Co., *Scanpenn,* Hango, 81 rolls newsprint.
Jay Madden Corp., *Scanpenn,* Hango, 133 bls. wood pulp board, 20 tons.
Perkins Goodwin & Co., *Hammaren,* Gothenburg, 648 bls. sulphate.
The Borregaard Co., Inc., *Hammaren,* Gothenburg, 28 bls. paper.
Castle & Overton, Inc., *Hammaren,* Gothenburg, 299 bls. dry pulp.
J. W. Hampton, Jr., & Co., *Hammaren,* Helsingfors, 80 rolls newsprint.
Wilkinson Bros., & Co., Inc., *Hammaren,* Helsingfors, 245 rolls newsprint.
Paper House of Pennsylvania, *Hammaren,* Helsingfors, 116 rolls newsprint.
Public Ledger, Inc., *Hammaren,* Helsingfors, 446 rolls newsprint.
Castle & Overton, Inc., *Hammaren,* Helsingfors, 134 bls. unbleached sulphite.
Neidich Process Co., *Hammaren,* Helsingfors, 13 bbls. tissue paper.
Pulp Sales Corp., *Hammaren,* Helsingfors, 3,572 bls. sulphite.
Jay Madden Corp., *Hammaren,* Helsingfors, 140 bls. wood pulp boards.
Certainteed Products Corp., *Pipestone County,* Havre, 376 bls. rags.
Castle & Overton, Inc., *Pipestone County,* Havre, 233 bls. rags.
E. J. Keller Co., Inc., *Pipestone County,* ———, 810 bls. rags.

WILMINGTON IMPORTS

WEEK ENDING FEBRUARY 11, 1939

Bulkley Dunton Pulp Co., Inc., *Scanpenn,* ———, 300 bls. sulphite.
Pulp Sales Corp., *Scanpenn,* Hango, 3,330 bls. sulphite, 666 tons.
Jay Madden Corp., *Scanpenn,* Hango, 1,352 rolls wood pulp boards.
Pulp Sales Corp., *Scanpenn,* Rauma, 5,885 bls. sulphite, 1,000 tons.

BALTIMORE IMPORTS

WEEK ENDING FEBRUARY 11, 1939

Gottesman & Co., Inc., *Kolsnaren,* Sweden, 3,000 bls. wood pulp.
W. H. Masson, Inc., *Sarcoxie,* London, 4 bls. printing paper.
Stora Kopparberg Corp., *Wanj,* Skutskar, 3,193 bls. dry pulp, 648 tons.
Pagel Horton & Co., Inc., *Wanja,* Gefle, 16,250 bls. wood pulp.
———, *Wanja,* Wallvik, 2,370 bls. wood pulp.
———, *Wanja,* Horneborg, 1,607 bdls. wall board.
Congoleum Nairn Co., *Black Gull,* Rotterdam, 278 bls. rags.
Congoleum Nairn Co., *Black Gull,* Antwerp, 425 bls. rags.
American Express Co., *Black Gull,* 8 cs. stencil paper.
Hearst Consolidated Publications, Inc., *Mormacport,* Kotka, 719 rolls newsprint.
Whitaker Paper Co., *Mormacport,* Kotka, 111 rolls newsprint.
Pulp Sales Corp., *Mormacport,* Kotka, 375 bls. sulphate; 75 tons; 721 bls. sulphite, 121 tons; 187 bls wood pulp, 37 tons.
Jay Madden Corp., *Mormacport,* Kotka, 1,763 rolls newsprint.
Perkins Goodwin & Co., *Hammaren,* Gothenburg, 328 bls. sulphate.
Nolan Bowmall & Co., Inc., *Hammaren,* Gothenburg, 78 rolls newsprint.
M. Sone, *Hammaren,* Gothenburg, 644 bls. wood pulp.
Castle & Overton, Inc., *Hammaren,* Helsingfors, 1,168 bls. bleached sulphite, 1,028 bls. unbleached sulphite.
H. Reeve Angel & Co., Inc., *Hammaren,* Helsingfors, 261 rolls newsprint.
Wilkinson Bros., & Co., Inc., *Hammaren,* Helsingfors, 120 rolls newsprint.
Jay Madden Corp., *Hammaren,* Helsingfors, 521 rolls newsprint.
Whitaker Paper Co., *Hammaren,* Helsingfors, 24 bls. newsprint.
Pulp Sales Corp., *Hammaren,* Helsingfors, 803 bls. mechanically ground pulp.
Congoleum Nairn Co., *Pipestone County,* Bordeaux, 820 bls. rags.
Pagel Horton & Co., Inc., *Kolsnaren,* Sweden, 8,875 bls. wood pulp.

NORFOLK IMPORTS

WEEK ENDING FEBRUARY 11, 1939

Jay Madden Corp., *Sarcoxie,* Finland, 356 rolls wrapping paper.
———, *Sarcoxie,* Hamburg, 117 rolls newsprint.
N. Y. Trust Co., *Black Gull,* Rotterdam, 154 bls. bagging.
Darmstadt Scott & Courtney, *Black Gull,* Antwerp, 71 bls. bagging.
Champagne Paper Corp., *Pipestone County,* Havre, 600 cs. cigarette paper.
R. J. Reynolds Tobacco Co., *Pipestone County,* St. Nazaire, 1,344 cs. cigarette paper.
H. H. Straus, *Pipestone County,* Bordeaux, 484 cs. cigarette paper.

HOUSTON IMPORTS

WEEK ENDING FEBRUARY 11, 1939

———, *Vigilant,* Gdynia, 120 bls. bagging.

Announce New Wet Strength Paper

A remarkable new wet strength paper developed by Brown Company may be obtained from the Kalamazoo Vegetable Parchment Company, the Paterson Parchment Company or Brown Company. This new paper is made by Brown Company's aqualized process, which is an exclusive process for imparting wet strength to purified celluloses.

Aqualized paper does not disintegrate when wet and retains an unusually high degree of its original strength even when completely saturated for a long period of time. This paper prints readily and has proved economical for a variety of uses.

Among the markets that may be served by aqualized paper are the meat packing industry, produce wrapping, food packing, crate lining and sacks and bags. There are also many possibilities for the paper in the combining, impregnating and twisting fields, as well as a wide variety of specialty uses by paper converters.

New York Market Review

Office of the PAPER TRADE JOURNAL,
Wednesday, February 15, 1939.

From reports received from many leading manufacturers' representatives, jobbers, and wholesale paper merchants, little change is indicated in the wholesale paper market for the current week. The general expectation among distributors appears to closely parallel the opinion industrial leaders and economists on the general business prospect, which is one of moderate optimism. As the decline in the paper trade in 1938 was far less severe than the average decline in other industries and amounted to only 12 per cent under the record year of 1937, there is justification in looking forward to a favorable current year.

The index of general business activity for the week ended February 4 declined sharply to 90.5 per cent, compared with 92.3 per cent for the previous week, and with 81.3 per cent for the corresponding week last year. Among the component industries comprising the index, automobile and electric power output registered more than seasonal declines, while paper declined only slightly and steel production accounted for the only increase in activity. Production of 207 paper mills was estimated at 79.4 per cent for the week ended February 4, while paper board production stood at 66.0 per cent, compared with paper production of 67.1 per cent, and paper board production of 65.9 per cent for the corresponding week last year.

The newsprint situation remains unchanged from the preceding week. The future prospect judged from the present, indicates a gradual increase in consumption as more pages are added to the daily papers of the country. As this is dependent upon the amount of advertising space sold, the future newsprint consumption is largely dependent upon the volume of advertising space contracted for in the coming months. The price structure of newsprint is favorable and no change from the prevailing dual price of $48 to $50 per ton is looked for in the trade.

The lag in demand for the better grades of printing papers used in direct mail and in general letterpress printing, continues under trade expectations. A little improvement in a few grades of sulphite papers, including the moderate priced and popular grades of bonds, has been reported by some merchants. Kraft paper continues very active and both production and demand are reported at a high level for the week. The demand for some grades of tissue papers is well maintained. Prices in general are relatively firm and while some talk is heard about higher prices no important change in the prices of any grades of paper has been reported this week.

Mechanical Pulp

The market situation in mechanical pulp continues unchanged and demand is rather light. No increase in tonnage appears likely in the near future at this date and as current prices are low no reduction is looked for in the trade.

Chemical Pulp

No important change in demand or prices has been reported in chemical pulp for the week. Prices are weak under a relatively slow and light demand and while the current price level for most grades of pulp is low, there appears little prospect for a change or an upward trend in prices under the conditions now prevailing.

Old Rope and Bagging

With the exception of sisal strings reported to be in fair demand, no change has occurred in the old rope market this week. Prices remain unchanged at prevailing market quotations. Business continues slow in old bagging, with the exception of the No. 3 roofing grade which is in more active demand at prevailing quotations of .60 to .70 per cwt.

Rags

Little change in demand is reported in the trade and no price changes have occurred this week in domestic rags, excepting reductions in No. 1 new white shirt cuttings which are currently quoted at 6.60 to 6.65 per cwt. The foreign rag market is inactive with only small lots of special grades being exported. Prices are nominal.

Old Waste Paper

The general tone of the old waste paper market is firm for the week. Prices in general remain unchanged at prevailing quotations. The exceptions are a small adjustment in the price of white envelope cuttings now quoted at 2.30 to 2.40, and in white ledger stock, currently quoted at from 1.10 to 1.20 per cwt.

Twine

Little change in demand for any grade of twine has been reported this week. Quotations on all grades of hard and soft fiber twines hold relatively firm at prevailing market prices.

Test Newsprint From Waste Paper

Quoting from a press dispatch from Pittsburgh, Pa., under date of February 14:—"Newsprint made from de-inked waste paper was successfully tested on the presses of the Pittsburgh Post Gazette, the Sun-Telegraph and the Press. Dr. W. F. Hochstetter, the inventor of the process, said, however, that it would be several months at least before commercial products could be started."

Dr. Hochstetter, it is said, is also working on a process to make newsprint from straw and other farm products and this also is to be tested soon on newspaper presses.

Miscellaneous Markets

Office of the PAPER TRADE JOURNAL,
Wednesday, February 15, 1939.

BLANC FIXE—Quotations on blanc fixe are unchanged and conform to prevailing price levels. The pulp is quoted at from $42.50 to $45 per ton, in bulk; the powder is quoted at from 3½ to 3¾ cents per pound, in barrels, at works.

BLEACHING POWDER—Prices on bleaching powder continue unchanged at prevailing quotations. Bleaching powder is quoted at from $2 to $2.25 per 100 pounds, in drums, at works.

CASEIN—The demand for casein is reported as fair for the week. Standard domestic casein, 20-30 mesh, is quoted at 8½ cents per pound; 80-100 mesh at 9 cents per pound. All prices in bags, car lot quantities.

CAUSTIC SODA—Quotations on caustic soda remain unchanged at prevailing market levels. Solid caustic soda is quoted at from $2.10 to $2.30 per 100 pounds; flake and ground at from $2.50 to $2.70 per 100 pounds, in drums, at works.

CHINA CLAY—Prices on china clay continue firm and unchanged at prevailing market quotations. Imported clay is quoted at from $14.50 to $25 per ton, ship side. Domestic filler clay is offered at from $6.50 to $12 per ton; coating clay at from $11 to $22 per ton, at mines.

CHLORINE—Quotations on chlorine are unchanged and conform to prevailing market levels. Chlorine is quoted at $2 per 100 pounds, in single-unit tank cars, f.o.b., works.

ROSIN—The demand for rosin is reported fair for the current week. "G" gum rosin is quoted at $5; "F" wood rosin at $4.25, per 280 pounds, gross weight, in barrels, at Savannah. Seventy per cent gum rosin size is offered at $2.75 per 100 pounds, f.o.b., shipping point.

SALT CAKE—Quotations on salt cake remain firm and unchanged. Prices range at from $12 to $13.50 per ton; chrome salt cake at from $11 to $12 per ton, f.o.b., shipping point. Imported salt cake is quoted at from $14.50 to $15 per ton, Gulf or Atlantic Seaboard, on dock.

SODA ASH—Prices on soda ash are unchanged and conform to prevailing market quotations. Prices on soda ash in car lots, at works, per 100 pounds, are as follows: in bulk, $.90; in bags, $1.05; and in barrels, $1.35.

STARCH—Quotations on corn starch continue unchanged for the week. Globe pearl is quoted at $2.60 per 100 pounds; special paper starch is offered at $2.70 per 100 pounds. All prices in bags, car lots, f.o.b., Chicago.

SULPHATE OF ALUMINA—Prices on sulphate of alumina are unchanged at prevailing market quotations. The commercial grades are quoted at $1.15; iron free at $1.30, per 100 pounds, in bags, car lot quantities, f.o.b., works.

SULPHUR—Quotations on sulphur continue firm and conform to prevailing market prices. Annual contracts are quoted at $16 per long ton, f.o.b., mines. Spot and nearby car lots are offered at $19 per ton.

TALC—Prices on talc remain firm and unchanged for the current week. Domestic talc is quoted at from $15 to $18 per ton, Eastern mines. Imported talc is offered at from $25 to $40 per ton, on dock.

Keyes Fibre Nets $110,232

Keyes Fibre Company reports as follows for 1938: Net income, $110,232, equal to $45.05 each on 2,447 six per cent prior preferred shares, against $65,946, or $26.95 a share on the preferred in 1937.

Market Quotations

Paper

(Delivered New York)

News, per ton—			
Roll, contract	$50.00	@	—
Sheets	58.00	@	—
Kraft—per cwt.—Delivered Zone A			
No. 1 Northern	$4.75	@	$5.25
Superstandard	4.12½	@	4.62½
Northern Standard Wrapping	4.00	@	—
Standard Wrapping	3.50	@	—
Tissues—Per Ream—Carlots			
White No. 1	.92½	@	—
White No. 1 M. G.	.90	@	—
White No. 1½	.67½	@	—
White No. 2	.60	@	—
Anti-Tarnish M. G.	.75	@	—
Colored	.87½	@	—
Kraft	.75	@	—
Manila	.60	@	—
Unbl. Toilet, 1 M.	3.20	@	—
Bleached Toilet	5.26	@	—
Paper Towels—			
Unbleached	1.80	@	—
Bleached	2.10	@	—
Manila—per cwt.—C. l. f. a.			
No. 1 Jute	8.25	@	9.75
No. 2 Jute	7.50	@	9.00
No. 1 Manila Wrapping, 35 lb.	5.00	@	—
No. 2 Manila Wrapping, 35 lb.	4.75	@	—
Boards, per ton—			
News	27.50	@	30.00
Chip	27.50	@	30.00
Sgl. Mla. Lt. Chip.	42.50	@	—
Jute Lined Chip	42.50	@	45.00
White Pat. Coated.	55.00	@	57.50
Kraft Liners	42.50	@	45.00
Binders Boards	71.00	@	77.00

The following are representative of distributors' resale prices:

Rag Content Bonds and Ledgers—
White, Assorted Items,
Delivered in Zone 1:

	Bonds		Ledgers	
100% Rag Ext. No. 1.	$39.10	@ $46.00	$40.25	@ $47.25
100% Rag	31.05	@ 36.50	32.20	@ 37.75
85% Rag	.....		29.90	@ 35.00
75% Rag	23.60	@ 27.75	24.75	@ 29.00
65% Rag	.....		21.65	@ 26.25
50% Rag	17.55	@ 21.50	18.70	@ 22.75
25% Rag	14.65	@ 17.75	15.80	@ 19.25

Colors at $1.00 cwt. extra.

Sulphite Bonds and Ledgers—
White, Assorted Items,
Delivered in Zone 1:

	Bonds		Ledgers	
No. 1	$8.60	@ $10.50	$9.75	@ $12.00
No. 2	7.70	@ 9.50	8.90	@ 10.75
No. 3	6.85	@ 8.25	8.00	@ 9.75
No. 4	6.45	@ 7.75	7.60	@ 9.25

Colors $1.00 cwt. extra.

Free Sheet Book Papers—
White, Cased Paper,

Delivered in Zone 1:

No. 1 Glossy Coated	$10.80	@	$12.50
No. 2 Glossy Coated	9.25	@	10.75
No. 3 Glossy Coated	8.15	@	9.50
No. 4 Glossy Coated	7.65	@	9.00
No. 1 Antique (watermarked)	7.65	@	9.00
No. 2 Offset	7.00	@	8.25
A Grade E. F.	6.80	@	8.00
A Grade S. & S. C.	7.05	@	8.25
B Grade E. F.	6.25	@	7.50
B Grade S. & S. C.	6.50	@	7.75
C Grade E. F.	6.00	@	7.00
C Grade S. & S. C.	6.25	@	7.25
D Grade E. F.	5.70	@	6.75
D Grade S. & S. C.	5.95	@	7.00

Ivory & India at $.50 cwt. extra.

Mechanical Pulp

(On Dock, Atlantic Ports)

No. 1 Imported—			
Moist	25.00	@	28.00
Dry	25.00	@	28.00
(Delivered)			
No. 1 Domestic and Canadian	29.00	@	33.00

Chemical Pulp

(On Dock, Atlantic, Gulf and West Coast Ports)

Bleached Sulphite (Domestic and Foreign)—			
Prime Bleached Sulphite	2.25	@	2.75
Prime Qualities—			
Easy-Bleaching Sulphite	1.90	@	2.10
Strong Unbleached Sulphite	1.80	@	2.00
(On Dock, Atlantic Ports)			
Kraft Bleached	2.50	@	2.75
Kraft Light & Strong	1.60	@	1.75
Kraft No. 1	1.45	@	1.65
Kraft No. 2	1.40	@	1.45
(F. o. b. Pulp Mill)			
Kraft Domestic	1.25	@	1.75
(Delivered)			
Soda Bleached	2.55	@	—

Add 60 cents per short ton, dock charges for Albany; $2.50 for Lake Ports East and $3.50 for Lake Ports West of Mackinac Straits.

Domestic Rags

New Rags

(Prices to Mill f. o. b. N. Y.)

Shirt Cuttings—			
New White, No. 1.	6.60	@	6.65
Silesias No. 1	4.00	@	4.25
New Unbleached	6.50	@	6.75
Blue Overall	4.75	@	5.00
Fancy	2.00	@	2.15
Washables	1.50	@	1.60
Mixed Khaki Cuttings	3.00	@	3.25
O. D. Khaki Cuttings	4.00		4.25

Old Rags

White, No. 1—			
Repacked	2.90	@	3.15
Miscellaneous	2.10	@	2.25
White, No. 2—			
Repacked	1.50	@	1.60
Miscellaneous	1.25	@	1.40
Thirds and Blues—			
Repacked	1.30	@	1.40
Miscellaneous	1.15	@	1.20
Roofing Rags—			
No. 1	1.10	@	1.15
No. 2	.90	@	.95
No. 3 (bagging)	.60	@	.70
No. 4	.65	@	.70
No. 5A	.65	@	.70

Foreign Rags

New Rags

New Dark Cuttings	2.25	@	2.40
New Mixed Cuttings	2.00	@	2.20
New Light Silesias	5.50	@	5.75
Light Flannelettes	5.50	@	5.75
New White Cuttings	7.00	@	7.50
New Light Oxford	4.00	@	4.50
New Light Prints	3.00	@	3.25

Old Rags

No. 1 White Linens	7.50	@	8.50
No. 2 White Linens	6.50	@	7.50
No. 3 White Linens	4.50	@	—

J. Andersen & Co.
Selling Agents
21 East 40th Street
New York

CHEMICAL & MECHANICAL PULP

Kraft Pulp
BERGVIK OCH ALA NYA AKTIEBOLAG
Söderhamn, Sweden
KALIX TRÄINDUSTRI AKTIEBOLAG
Vanaförden, Sweden
MUNKSUNDS AKTIEBOLAG
Munksund, Sweden
NEMSJÖ CELLULOSA A-B.
Sprängsviken, Sweden

Bleached Sulphite
KELLNER-PARRINGTON PAPER PULP CO., LTD.
Sarpsborg, Norway
Edsvalla, Sweden
Hallein & Villach, Austria

Unbleached Sulphite
AKTIESELSKABET GREAKER CELLULOSEFABRIK
Greaker, Norway
BERGVIK OCH ALA NYA AKTIEBOLAG
Söderhamn, Sweden
CELLULOSEFABRIKS A.-G.
Bratislava, Czecho-Slovakia
SVANÖ AKTIEBOLAG
Svanö, Sweden

THE DRAPER FELTS

All kinds and styles of Felts for all kinds and styles of Papers.

Write us about your Felt problems and let us help you reduce your Felt Costs—we will call anywhere at any time.

DRAPER BROS. COMPANY
CANTON, MASS.
Woolen manufacturers since 1856

Mundt
Perforated Screens
For Pulp and Paper Mills
Steel, Copper, Brass
Bronze, Monel Metal
and Other Alloys
Punched for Centrifugal
and Rotary Screens,
Pulp Washers, Drainer
Bottoms, Filter Plates, etc.
Charles Mundt & Sons
67 Fairmount Ave. Jersey City, N. J.

ENGLISH ECCO CLAYS CLAYS
TRADE MARK
UNIFORM • SUPERIOR • DEPENDABLE
English China Clays Sales Corporation
551 Fifth Avenue, New York City

No. 4 White Linens.	2.25	@	3.25
No. 1 White Cotton.	4.25	@	4.75
No. 2 White Cotton.	3.25	@	3.75
No. 3 White Cotton.	2.50	@	3.00
No. 4 White Cotton.	1.90	@	2.20
Extra Light Prints..	2.00	@	2.40
Ord. Light Prints...	1.75	@	2.15
Med. Light Prints...	1.55	@	1.95
Dutch Blue Cottons.	2.25	@	2.50
French Blue Linens..	3.00	@	—
Checks and Blues...	2.00	@	—
Linsey Garments....	1.90	@	2.00
Dark Cottons.....	1.50	@	1.60
Old Shopperies.....	1.30	@	1.45
New Shopperies.....	1.45	@	1.50
French Blues.....	2.25	@	2.50

Old Rope and Bagging

(Prices to Mill, f. o. b. N. Y.)

Gunny No. 1—			
Foreign	1.75	@	1.90
Domestic	1.70	@	1.80
Wool Tares, light....	1.60	@	1.70
Wool Tares, heavy...	1.80	@	1.90
Bright Bagging.....	1.60	@	1.70
Manila Rope—			
Foreign	2.60	@	2.75
Domestic	2.00	@	3.00
Jute Threads.....	2.75	@	3.00
Sisal Strings.....	1.50	@	1.60
Mixed Strings.....	.55	@	.60

Old Waste Papers

(F. o. b. New York)

Shavings—			
White Envelope Cuttings	2.30	@	2.40
Ordinary Hard White No. 1....	1.90	@	2.00
Soft White No. 1..	1.60	@	1.75
Soft White Extra..	2.25	@	2.40
Flat Stock—			
Stitchless	.80	@	.85
Overissue Mag.....	.70	@	.75
Solid Flat Book...	.55	@	.60
Crumbled No. 1...	.40	@	.45
Ledger Stock White.	1.10	@	1.20
Ledger Stock Colored	.60	@	.70
New B. B. Chips....	.15	@	.20
Manila—			
New Env. Cut.....	1.40	@	1.50
New Cuttings.....	1.00	@	1.20
Old Kraft Machine-Compressed bales..	.50	@	.60
News—			
No. 1 White News	1.25	@	1.30
Strictly Overissue..	.40	@	.45
Strictly Folded....	.35	@	.40
No. 1 Mixed Paper..	.15	@	.20

Twines

(F. o. b. Mill)

(Soft Fiber)

Coarse Polished—			
India	.12¾	@	.14¼
White Hemp.....	.13¾	@	.15¼
Fine Polished—			
Fine India.....	.16	@	.18
Unpolished—			
Box	.09½	@	—
Paper Makers.....	.09½	@	.10½
Tube Rope.....	.10¼	@	.12½
Wall Paper.....	.10¼	@	.12½
Wrapping	—	@	—
Soft Fiber Rope...	.12	@	.14
Cotton	.17	@	.20
(Hard Fiber)			
Medium Java.....	.11	@	.17
Mex. Sisal.....	.10	@	.16
Manila	.16	@	.23

PHILADELPHIA

Domestic Rags (New)

(Price to Mill, f. o. b. Phila.)

Shirt Cuttings—			
New White, No. 1.	.06	@	.06¼
New White, No. 2.	.03½	@	.04
Light Silesias.....	.03½	@	.04
Silesias, No. 1....	—	@	.04½
Black Silesias, soft	—	@	.03
New Unbleached..	.05½	@	.06
Washable, No. 1..	.01½	@	.01¾
Blue Overall.....	.04	@	.04½
Cottons—Acording to grades—			
Washable No. 2....	.01	@	.01¼
New Blue.....	.01	@	.01¼
Fancy Percales.....	—	@	.02½
New Black Soft...	.03	@	.03½
New Light Seconds	—	@	.04½
New Dark Seconds	.50	@	.75
Khaki Cuttings—			
No. 1 O. D.....	.03	@	.03½
No. 2 Mixed.....	.02	@	.02½
Corduroy	—	@	.02
New Canvas.....	.05	@	.05½
New Black Mixed.	.02½	@	.02¾

Domestic Rags (Old)

White No. 1—			
Repacked	3.00	@	3.25
Miscellaneous	2.50	@	2.75
Thirds and Blues—			
Miscellaneous	1.00	@	1.25
Repacked	1.50	@	1.75
Black Stockings (Export)	3.00	@	3.50
Roofing Stock—			
Foreign No. 1....	—	@	1.20
Domestic No. 1...	—	@	1.10
Domestic No. 2...	—	@	.90
Roofing Bagging..	—	@	.80

Bagging

(F. o. b. Phila.)

Gunny, No. 1—			
Foreign	1.75	@	2.00
Domestic	1.50	@	1.75
Manila Rope.....	—	@	3.50
Sisal Rope.....	1.50	@	1.75
Mixed Rope.....	.75	@	1.00
Scrap—			
No. 1.....	—	@	1.75
No. 2.....	1.00	@	1.25
Wool Tares, heavy..	3.25	@	3.50
Mixed Strings.....	.75	@	1.00
No. 1 New Light Burlap	2.50	@	3.00
New Burlap Cuttings	1.75	@	2.00

Old Papers

(F. o. b. Phila.)

Shavings—			
No. 1 Hard White.	2.25	@	2.30
No. 2 Hard White.	1.90	@	2.00
No. 1 Soft White..	1.75	@	1.80
No. 2 Soft White..	1.30	@	1.40
No. 1 Mixed.....	.65	@	.75
Solid Ledger Stock..	1.45	@	1.50
Ledger Stock, white.	1.15	@	1.20
Ledger Stock, colored	.75	@	.80
No. 1 Books, heavy..	.60	@	.75
Manila Cuttings.....	1.45	@	1.50
Print Manila.....	.40	@	.45
Container Manila....	.35	@	.40
Kraft Paper.....	.75	@	.80
No. 1 Mixed Paper..	.20	@	.25
Straw Board Chip...	.25	@	.30
Binders Board Chip.	.25	@	.30
Corrugated Board...	.50	@	.55
Overissue News.....	.40	@	.45
Old Newspapers.....	.35	@	.40

BOSTON

Old Papers

(F. o. b. Boston)

Shavings—			
No. 1 Hard White	2.25	@	2.50
No. 1 Soft White..	1.85	@	2.15
No. 2 Mixed.....	.75	@	.80
Solid Ledger Books..	1.30	@	—
Overissue Ledger Stock	1.30	@	1.50
Mixed Ledgers.....	.85	@	.90
No. 1 Books, heavy..	.65	@	.75
No. 1 Books, light...	.65	@	.75
Crumpled Stitchless Book Stock.....	.55	@	.65
Manila Env. Cuttings	1.70	@	1.85
Manila Envelope Cuttings, extra quality.	2.00	@	2.10
No. 1 Old Manila...	.75	@	.85
No. 1 Old Manila...	.80	@	.90
White Blank News..	1.30	@	1.40
No. 1 Kraft.....	.80	@	.85
Mixed Papers.....	.15	@	—
Print Manila.....	.45	@	.55
Container Manilas...	.27½	@	—
Old Newspapers.....	.25	@	.32½
Paper Wool Strings..	.50	@	.65
Overissue News.....	.45	@	.50
Box Board Chips....	.20	@	.25
Corrugated Boxes....	.25	@	.30
Kraft corrugated boxes	.60	@	.70
Screening Wrappers..	.40	@	.45

Bagging

(F. o. b. Boston)

Manila Rope—			
Foreign	2.65	@	2.75
Domestic	2.65	@	2.75
Sisal Rope.....	1.60	@	1.65
Mixed Rope.....	.40	@	.50
Transmission Rope...	1.90	@	2.00
Soft Jute Rope.....	1.80	@	2.00
Jute Carpet Threads.	.75	@	.90
Gunny Bagging—			
Foreign	1.65	@	1.75
Domestic	1.60	@	1.65
Bleachery Burlap....	2.75	@	3.00
Scrap Burlap—			
Foreign	1.55	@	1.65
Domestic	1.40	@	1.50
Scrap Sisal.....	1.25	@	1.40
Scrap Sisal for Shredding	1.60	@	1.75
Wool Tares, Heavy..	1.50	@	1.60
New Burlap Cuttings	2.00	@	2.25
Aust. Wool Pouches.	2.50	@	3.00
Heavy baling bagging	1.75	@	1.85
Paper Mill Bagging..	1.00	@	1.15
No. 2 Bagging.....	.50	@	.70

Domestic Rags (New)

(F. o. b. Boston)

Shirt Cuttings—			
New Light Prints...	.03¼	@	.03½
New White No. 1....	.06¾	@	.07
New Light Flannelettes	.04¾	@	—
Silesias No. 1.....	.04¾	@	—
New Black Silesias..	.03¾	@	.04
Soft Unbleached.....	6.50	@	7.00
Blue Cheviots.....	.05	@	.05¼
Fancy	.03	@	.03¾
Washable	.02¾	@	.03
Cottons—According to grades—			
Blue Overalls.....	.04¼	@	.05
New Black, soft...	.03¾	@	.04
Khaki Cuttings.....	.03	@	.03¼
O. D. Khaki.....	.04	@	—
Corduroy	.02¼	@	.03
New Canvas.....	.06¾	@	.07¼
B. V. D. Cuttings...	.06¾	@	—

Domestic Rags (Old)

(F. o. b. Boston)

Canvas	.04½	@	—
White No. 1—			
Repacked	—	@	2.75
Miscellaneous	2.50	@	2.75
White No. 2—			
Repacked	1.90	@	2.00
Miscellaneous	2.00	@	2.25
Twos and Blues.....	1.75	@	2.00
Old Blue Overalls...	1.50	@	—
Thirds and Blues—			
Repacked	1.37½	@	1.75
Miscellaneous	1.25	@	1.62½
Black Stockings.....	3.90	@	4.00
Roofing Stock—			
No. 1.....	1.00	@	1.10
No. 2.....	.75	@	.85
No. 3.....	.65	@	.70

Foreign Rags

(F. o. b. Boston)

Dark Cottons.....	1.00	@	1.10
Dutch Blues.....	2.65	@	2.75
New Checks and Blues	2.85	@	3.00
Old Fustians.....	2.25	@	2.50
Old Linsey Garments	2.20	@	2.25
New Silesias.....	4.50	@	4.75

CHICAGO

Old Papers

(F. o. b. Chicago)

Shavings—			
No. 1 White Envelope Cuttings....	1.80	@	1.90
No. 1 Hard White.	1.70	@	1.80
No. 1 Soft White..	1.50	@	—
Ledger & Writings..	.75	@	.80
Solid Books.....	.45	@	.50
Blanks	.90	@	—
Krafts	.45	@	.50
New Kraft Cuts.....	1.10	@	—
Manila Env. Cuts...	Nominal		
Ex. No. 1 Manila...	Nominal		
Print Manila.....	Nominal		
Overissue News.....	.35	@	—
Old Newspapers—			
No. 1 Folded News	.25	@	.30
No. 1 Mixed Paper	.15	@	.20
Roofing Stocks—			
No. 1.....	1.00	@	1.05
No. 2.....	.85	@	—

TORONTO

Paper

Bonds

Direct mill shipment in two-ton lots

No. 1 White $35.50		@	—
No. 1 Tints 36.50		@	—
No. 2 White 25.50		@	—
No. 2 Tints 26.50		@	—
No. 2 Golden Rod.. 27.50		@	—
No. 3 White 21.00		@	—
No. 4 White 15.00		@	—
No. 4 Tints 16.00		@	—
No. 4 Golden Rod.. 17.00		@	—

Direct mill shipment in three-ton lots

No. 5 White $10.50		@	—
No. 5 Tints 11.50		@	—
No. 5 Golden Rod.. 12.00		@	—
No. 6 White 9.00		@	—
No. 6 Tints 9.50		@	—
No. 6 Golden Rod.. 11.00		@	—
No. 7 White 8.00		@	—
No. 7 Tints 8.50		@	—
No. 7 Golden Rod.. 10.00		@	—
Book—			
No. 1 M. F. $7.00		@	—
No. 2 M. F. 6.50		@	—
No. 3 M. F. 5.25		@	—
No. 1 S. C. 7.25		@	—
No. 2 S. C. 6.75		@	—
No. 3 S. C. 5.75		@	—

Coated Book & Litho

Ton Lots (resale)

No. 1 .....$12.00		@	—
No. 2 ..... 10.25		@	—
No. 3 ..... 8.90		@	—
Coated tinted 13.00		@	—
Wrapping—delivered—			
Rag Brown.....	4.85	@	5.25
White Wrap.....	4.00	@	—
"B" Manila.....	4.90	@	6.15
No. 1 Manila.....	5.50	@	6.90
Fiber	5.50	@	6.90
Kraft No. 2.....	5.50	@	6.90

(F. o. b. Cars, Toronto)

News per ton—			
Rolls (contract)...46.00		@	—
Sheets 54.00		@	—

Pulp

Ground wood.....29.50		@	—
Bleached sulphite....54.00		@	—
Unbleached sulphite..44.00		@	—
Kraft 50.00		@	—
Soda 51.00		@	—

Old Waste Paper

(In carload lots, f. o. b. Toronto)

Shavings—			
White Env. Cut...	2.25	@	—
Soft White.....	2.15	@	—
White Blk. News..	1.25	@	—
Book and Ledger—			
Flat Magazine and Book Stock (old)	.70	@	—
Light and Crumpled Book Stock.	.60	@	—
Ledgers and Writings	1.00	@	—
Manilas—			
New Manila Cut..	1.35	@	—
Printed Manilas...	.45	@	—
Kraft	.95	@	—
News and Scrap—			
Strictly Overissue..	.50	@	—
Strictly Folded....	.45	@	—
No. 1 Mixed Paper..	.30	@	—

Domestic Rags

(Price to Mills, f. o. b. Toronto)

No. 1 White Shirt Cuttings	.06½	@	.06¾
Fancy Shirt Cuttings	.02¾	@	.03½